THE BULLETIN of the NATIONAL INSTITUTE FOR ARCHITECTURAL EDUCATION

VOLUME XXXVI 1959-1960 Number Five AUGUST 1960

CONTENTS

The BULLETIN of the National Institute for Architectural Education invites submission of manuscripts, news items, and notes from students and professionals. The reports of the competitions are presented in the BULLETIN as unofficial opinions of the authors and should not be interpreted as the collective opinion of the evaluating jury. Moreover, the N I A E cannot be held to account for any statements or opinions printed in magazine.

The BULLETIN of the NIAE is issued by the National Institute for Architectural Education 115 East 40th Street, New York 16, N.Y. The subscription rate to the BULLETIN with reproductions of designs is $25.00 for the school year, without reproductions the rate is $2.00 for the school year. Single reproductions of current work of a school year may be purchased at $1.00 per print; reports of problems at $1.00 a copy.

Reproductions and reports of work of any previous school year, if available, are $2.00 per print or per report.

Subscribers are requested to give notice of any change of mailing address promptly.

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TILE COUNCIL OF AMERICA, INC. SCHOLARSHIPS

Sponsored by the members of the Tile Council of America, Inc.
Two scholarships of $500 each.

A GAZEBO

Competition Regulations

Design solution must be completed in any ten (10) consecutive days between January 11, 1960 and May 16, 1960.

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All parts of any entry must be uniform in size not exceeding 30″ x 40″; technique or presentation is optional unless otherwise called for in a program.

All plans to be similarly oriented.

Entries must be sent prepaid upon completion. They will be returned collect.

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A GAZEBO

TILE COUNCIL OF AMERICA, INC. SCHOLARSHIPS

Two scholarships of $500 each.

A scenic tract of land bordering a lake has been acquired by a corporation for a country club. The land along the lake varies in level, and at one point there is a vertical drop of about 25 feet. This strip of land which projects 60 feet from the mainland, is 30 feet wide. The country club has been planned so that its dining and dancing terrace faces this promontory which is to be landscaped. At the end of the promontory, overlooking the lake, a gazebo is to be built.

The gazebo must provide maximum views and shelter from the weather. No dimension of the gazebo shall exceed 20 feet.

REQUIRED DRAWINGS:

On one 30″ x 40″ or two 20″ x 30″ illustration boards.

Plot plan of promontory showing building and landscaping. Indicate compass points. Scale 3/8″ to the foot.

Section and elevation of the gazebo at the scale of 3/8″ to the foot.

Two perspectives showing the gazebo from different points of view.

Color is mandatory.

NOTE:

Funds for these scholarship awards have been made available through the generosity of the Tile Council of America, Inc., which has genuine interest in the development of architectural education. It has, however, in no way dictated the character, or any of the requirements of the program. These requirements have been determined solely by the NIAE on a purely educational basis, as will be the jury's evaluation of the submissions.

The creative use of ceramic tile in the problem is desirable but optional.

DATA ON CERAMIC TILE

Courtesy of the TILE COUNCIL OF AMERICA

In conjunction with their annual scholarship awards, the Tile Council of America, Inc., comprising 25 leading U. S. manufacturers of ceramic floor and wall tile, have compiled the following factual information to give students a working knowledge of the material. The scholarships offered in collaboration with the National Institute for Architectural Education this year are two scholarships of $500 each.

What Ceramic Tile Is. Tile is made from clay and/or other ceramic materials and fired at very high temperatures (2,000° approximately) to produce a strong, durable material.

The product manufactured by the members of the Tile Council is a tile used as a veneer, or beautiful surface material with lasting wearing qualities, ranging generally from ¼″ to ¾″ in thickness; it is not to be confused with structural tile, terra cotta or cement blocks.

The following comprise the ceramic tile family:

Glazed Tiles often specified are 4¼″ x 4¼″, 6″ x 6″ and 6″ x 3″. However, sizes generally available range from as small as 1¼″ x 1¼″ up to 12 ″ x 16″. Glazed tile usually is used for walls, but special types can be used for floors receiving light traffic.

Unglazed Tiles range in size from 11/32″ x 11/32″ up to 6″ x 6″. Intermediate sizes include ½″ x ½″, ½″ x 1-1/16″, ¾″ x 1-9/16″, 1″ x 1″, 1″ x 2″, ¾″ x ¾″, 1-9/16″ x 1-9/16″, 2″ x 2″, 2-3/16″ x 2-3/16″, 2-3/16″ x 1-1/16″ and 1-1/16″ x 1-1/16″. They are used for floors and walls.

Quarry Tiles are a heavy-duty glazed and unglazed type usually used for floors but also seen on walls and counters. Common sizes are 2¾″ x 2¾″, 2¾″ x 6″, 2¼″ x 8″, 3⅞″ x 8″, 3⅞″ x 12″, 6″ x 6″, 6″ x 9″, and 9″ x 9″.

Properties of Ceramic Tile. Ceramic tile is waterproof, colorfast, fireproof, sanitary and easily cleaned, durable and unaffected by acids and alkalis. It is stainproof, non-absorbent and resistant to abrasion. It does not need waxing, varnishing, painting or other redecorating, so that it has one of the lowest maintenance costs of all materials.

Tile in Architecture. Ceramic tile has been used for more than 7,000 years. It has played an important role in the architecture of Egypt, Persia, Turkey, Italy, Spain, Germany, France, Holland, England, Brazil and other nations. In the United States it has been used since Colonial times.

Design Possibilities. Ceramic tile is now made in more than 200 shades of basic colors. It is also manufactured in a great variety of sizes, and as a result practically any pattern can be worked out in it.

Installation Methods vary according to circumstances. The new dry-curing, thin-setting mortars manufactured in accordance with the Tile Council's formula 756 have the favorable characteristics of conventional mortar and can be used to set dry tile on dry backing. This frees the mechanic from the usual chores of soaking tile, saturating block walls and maintaining damp conditions. Installation of ceramic tile with conventional cement mortar and cement grouting is covered in the Tile Council's specification guide, *The Tile Handbook.* Another Tile Council publication, *K-400 — Thin Setting Bed Methods and Materials* describes the installation of ceramic tile with adhesives and thin-set cements.

Uses of Ceramic Tile are unlimited on interiors and exteriors of residential, commercial, institutional and industrial buildings. Besides bathrooms, typical residential uses include kitchens, family rooms, living and dining areas, bedrooms, basements, terraces, porches, patios, foyers, fireplaces, window sills, and work counters. In hospitals ceramic tile is found in operating rooms, diet kitchens, corridors and promenade decks. Ceramic tile is practically standard for washrooms in public and commercial structures, walls and floors in restaurant and cafeteria kitchens, store fronts, grease pits and automobile showrooms and floors and walls of dairy and bottling plants.

For further information. Local tile contractors can show tile samples and suggest installations to visit. The Tile Council of America, Inc., at 800 Second Ave., New York 17, N. Y., will be glad to answer any special technical questions.

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Intermediate Problem Spring Term 1959-1960

KENNETH M. MURCHISON PRIZE

Created by Society of Beaux-Arts Architects in 1939-40 in memory of Kenneth M. Murchison

A COFFEE HOUSE ON THE LEFT BANK

Competition Regulations

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All plans to be similarly oriented.

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KENNETH M. MURCHISON PRIZE

A COFFEE HOUSE ON THE LEFT BANK

(Of any estuary, river, stream, brook, creek or rill, anywhere in the world.)

PREAMBLE

Survival for the very young is the reward of conformity. All young people are conservatives. In order to mature, young men and women must rebel. If they are unable to rebel constructively they will rebel destructively. The ambiguity of youth is the direct result of the ambivalence which arises from the inner conflict between conformity (parental dominance) and non-conformity (freedom and independence). A society plagued by juvenile delinquents is one which debars its youth from constructive revolt.

"Beat Generation—members of the generation that came of age after World War II who espouse mystical detachment and relaxation of social and sexual tensions, supposedly as a result of disillusionment stemming from the Cold War." (Coined by John Kerouac, born 1922, American author)—definition to appear in the newest edition of the American College Dictionary.

"Technically, a beatnik spouting poetry is an entertainer under law,
But though in violation, to the cops he's just a bore.
He can talk throughout the night if he doesn't incite to riot,
We hope he keeps talking till his audience yells for quiet."

Deputy Police Commissioner Walter Arm as quoted in the New York Times, June 9, 1959.

"...If I could endow you with the calamity of my wisdom I would teach you to frustrate a system in frustration by expecting it to do its worst to you. That will at least rob it of the miserable satisfaction in doing it. You are sanguine, excitable, optimistic. You offer yourself bound and helpless to the malice of the gods. They will be always leading you somewhere in order to convince you that there is nowhere to go to. They will transplant you to Timbuctoo so that you may find Timbuctoo a blasted hole and Hennessy's pub a tavern of dreams. And you would be right. So it is. Reality exists not in a pub, but in the dream of conception of a pub. Thus we posit the eternal contest between desire and the effort to attain it. We never realize that the conception of desire is its realization and the effort to achieve it by the gesture of action a mad fantasy. That gesture but announces to consciousness that by an image of desire desire has been achieved. Therefore we never achieve the realization of desire because we have achieved it. Oh subtle and ruthless devils, ... I announce the perfect ingenuity of your system with an utter repudiation of you who condescend to use so base a thing...., do you know why the gods are ruthless? Because they are happy. And they are never so happy as when they have earned our bitterest outcries of despair and self-contempt. That is the incense which feeds their altars—the signal by which they know they have conquered and driven us on our bellies into the mud of earth. Bah! Repudiate their insensate malice,... Achieve the gesture of desire and let its image be damned. Exalt the divinity of the present moment. Be happy and torture the gods with unhappiness because they cannot drive you to despair."

If you know the source of the above quotation do not even hint to anyone that you do so. Such an admission would convict you of having pretensions of literacy. This is the second most heinous crime it is possible for you to commit.

Apparently there is at least one non-destructive outlet for our young men and women. This is provided by the coffee house where they may listen to cool music, to singing, to poetry, or to each other endlessly talking. All of these are certainly more socially acceptable than murder, mugging or gang rape. Therefore we should provide plenty of coffee houses so that our young men and women may be given the opportunity to thumb their noses at the squares, and to diagnose all the ills that beset the world.

THE PROBLEM:

A smart young man with money has decided that coffee houses are a good investment and also a sound social cathartic. He proposes to build his first on an inside lot on the Main Street of a college town.

REQUIREMENTS:

Site:

The lot is 50 feet wide and 100 feet deep. It fronts on Main Street and has a service alley in the rear.

Building:

The building must not exceed one story in height but a part of the basement may be incorporated into the working area of the establishment. The remainder of the basement will house the boiler room.

Space Allocations:

Kitchen, about 200 square feet.
Gift Shop, about 200 square feet.
Coffee preparation, about 150 square feet.
Dessert preparation, about 150 square feet.
Table seating to accommodate 100.
Raised platform for orchestra, about 300 square feet.
Outdoor dining area seating 50.
Art exhibition area, about 300 square feet.
Waiting area seating 25 (this may be incorporated in the art or gift areas.)
Two small dressing rooms with toilets.
Public toilets for men and women.

There are no limitations governing the form of the exterior enclosure. It must, however, be readily identifiable. The interior must provide an environment which will be completely acceptable to its patrons.

REQUIRED DRAWINGS:

a. One exterior perspective.
b. Floor plan or plans at a scale of ¼″ to the foot.
c. Section at the same scale.
d. Detail sketch perspectives of interior features.
e. Color is optional.

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Advanced Problem Spring Term 1959-1960

HIRONS ALUMNI PRIZE

Sponsored by the Alumni to commemorate their inspiring teacher and critic, Frederic C. Hirons

AN OPERA HOUSE

Competition Regulations

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AN OPERA HOUSE

HIRONS ALUMNI PRIZE

In a large city, in a park bordering a lake, an Opera House is to be built. The park extends north and south for almost a mile between the lake and an important avenue which are parallel and 400 feet apart. The length of the land allocated for the Opera House is 520 feet along the lake and avenue making the total area 208,000 square feet. Pedestrians must have means of passage through this area so that a stroll in the park could be uninterrupted. The edge of the park is eight feet above the lake water and the land slopes up ten feet to the Avenue. Any part or element of the House may extend into or over the lake no more than 30 feet. Serious thought should be given to the problem of people arriving and leaving the building by motor car.

The capacity of the House is to be 2200 seats (New York Met now 3650, Paris Opera 2156). No seat should be more than 150 feet from the center stage at proscenium and a lesser limit is much more desirable where hearing the human voice is concerned.

Important items in any Opera House, aside from perfect acoustics and sight lines, are the storing of scenery and props and the means of changing the scenes with the greatest dispatch. Sight lines may be indicated with some authenticity on the section drawing.

Following are suggested dimensions for certain areas of the House which are slightly less than a new Metropolitan Opera House might require: The proscenium arch should be about 70 feet wide, the orchestra pit about 12 feet wide at center of apron. A good stage here might be 90 feet wide by 75 feet deep with a "rear" stage area of the same dimensions making a total depth of 150 feet. The front stage should contain elevators (4 to 6) so that these certain areas of the stage floor can be raised above or lowered below it, even to the basement level. On either side of the stage would be areas equal to the stage area, front and rear, where are located very large elevators which can bring up from below movable carts which comprise some part of a whole setting or, as in the case of a Mozart piece, the whole set, thus accelerating the scene changing interval.

Above the full stage, to the height of approximately 110 feet would rise the fly gallery to its so-called gridiron from which counter-weighted flies and flats, lighting and other paraphernalia are suspended. The rear areas of the sides-stages would be used for scenery storage also. Other scenery storage could be below stage for a grand total of 20,000 square feet, two-fifths of which would be 20 feet high, three-fifths 30 feet high.

Further elements to be provided for are:

Properties Shop	1500 sq. ft.
Wardrobe Storage	2500 sq. ft.
Electric Shop	2500 sq.ft.
Dressing Rooms	
1 for male extras	1000 sq. ft.
1 for female extras	1000 sq. ft.
1 for male chorus and ballet	1000 sq. ft.
1 for female chorus and ballet	1000 sq. ft.
1 for orchestra	1000 sq. ft.
4 large for minor role singers	1000 sq. ft. total
6 for leading singers	1000 sq. ft. total
Orchestra Rehearsal	1500 sq. ft.

The foregoing could be located above or below stage.

Two Singers' Rehearsal Rooms at stage level if possible.	1200 sq ft. each
Administration	
6 offices	300 sq. ft. each
Typists' area	300 sq. ft.
General Manager	300 sq. ft.
Small conference room and pantry	300 sq. ft.
Press Room	500 sq. ft.
Green Room	500 sq. ft.

Accessible from stage and to the public.

House Manager's Office	300 sq. ft.
Doctor's Office	300 sq. ft.

Both near box office or main foyer.

Box Office	500 sq. ft.
Vestibules	
Grand Foyer	
Stairs and/or ramps (Grand stair if deemed advisable)	
Ample Corridors, Promenades (interior, exterior)	
Adequate Toilet facilities throughout	
Medium-sized Restaurant and Kitchen	1800 sq. ft.
Large Bar (stand-up and sit-down)	1500 sq. ft.

A certain elegance should be evident in this design according with the traditions of Grand Opera. But even though this program may seem to imply classic Grand Opera House as its proper solution, the Grand Opera is not a static concept. Therefore submissions illustrating the widest variety of interpretation will be welcomed.

REQUIRED DRAWINGS:

Presented on two illustration boards 30″ x 40″.
Color is optional.

1. Plot plan containing Main (orchestra) floor plan at 1/32″ to the foot.
2. First Balcony plan at 1/32″ to the foot.
3. Second Balcony plan at 1/32″ to the foot.

If there are more balconies they should be evident on the sections.

4. Plan of basement or below-stage level at 1/32″ to the foot.
5. Longitudinal section at 1/32″ to the foot.
6. Transverse section at 1/32″ to the foot.
7. Perspective of the building as seen from the park indicating clearly the general character of the Opera House and expressing the materials of which it is built.

E 35


East Elevation
3/8 inch = one foot
Perspective
Looking South
Section
3/8 inch = one foot
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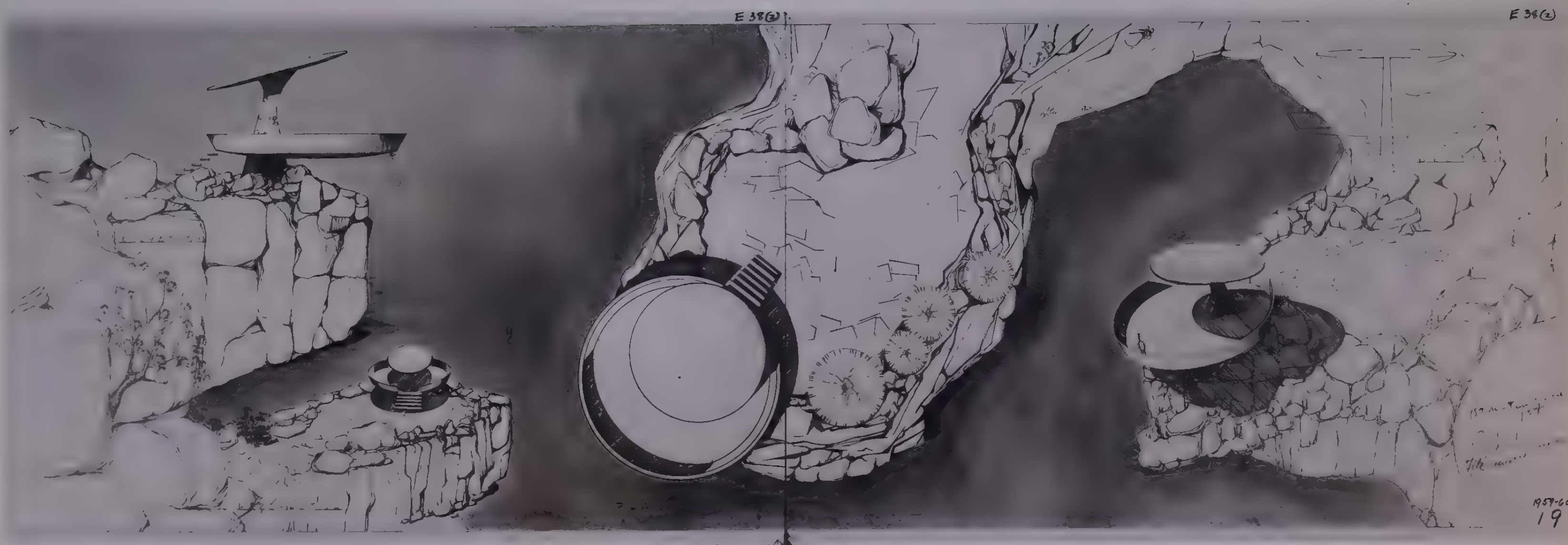
1959-60
18



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E 38(2)
1959-60
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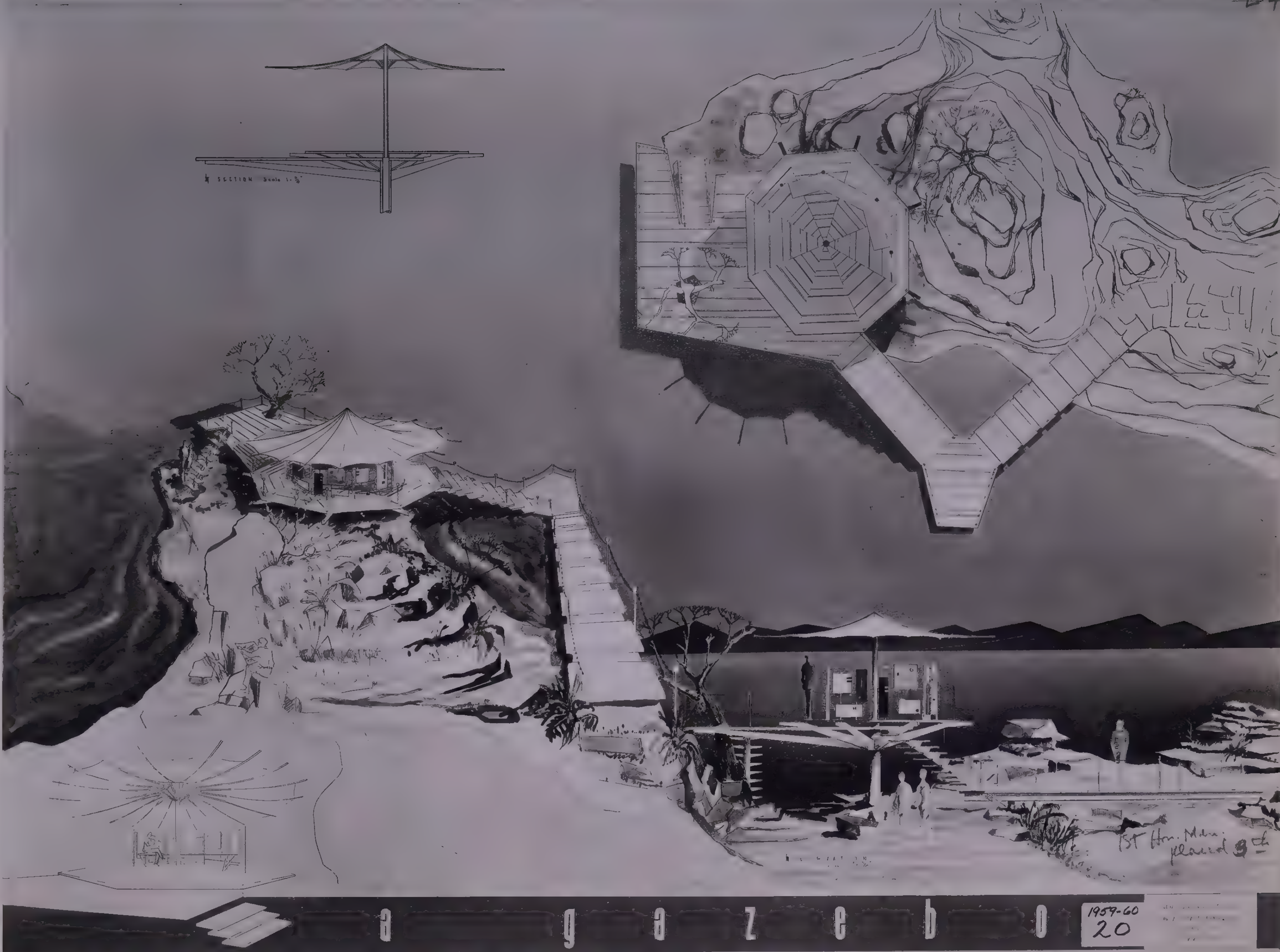
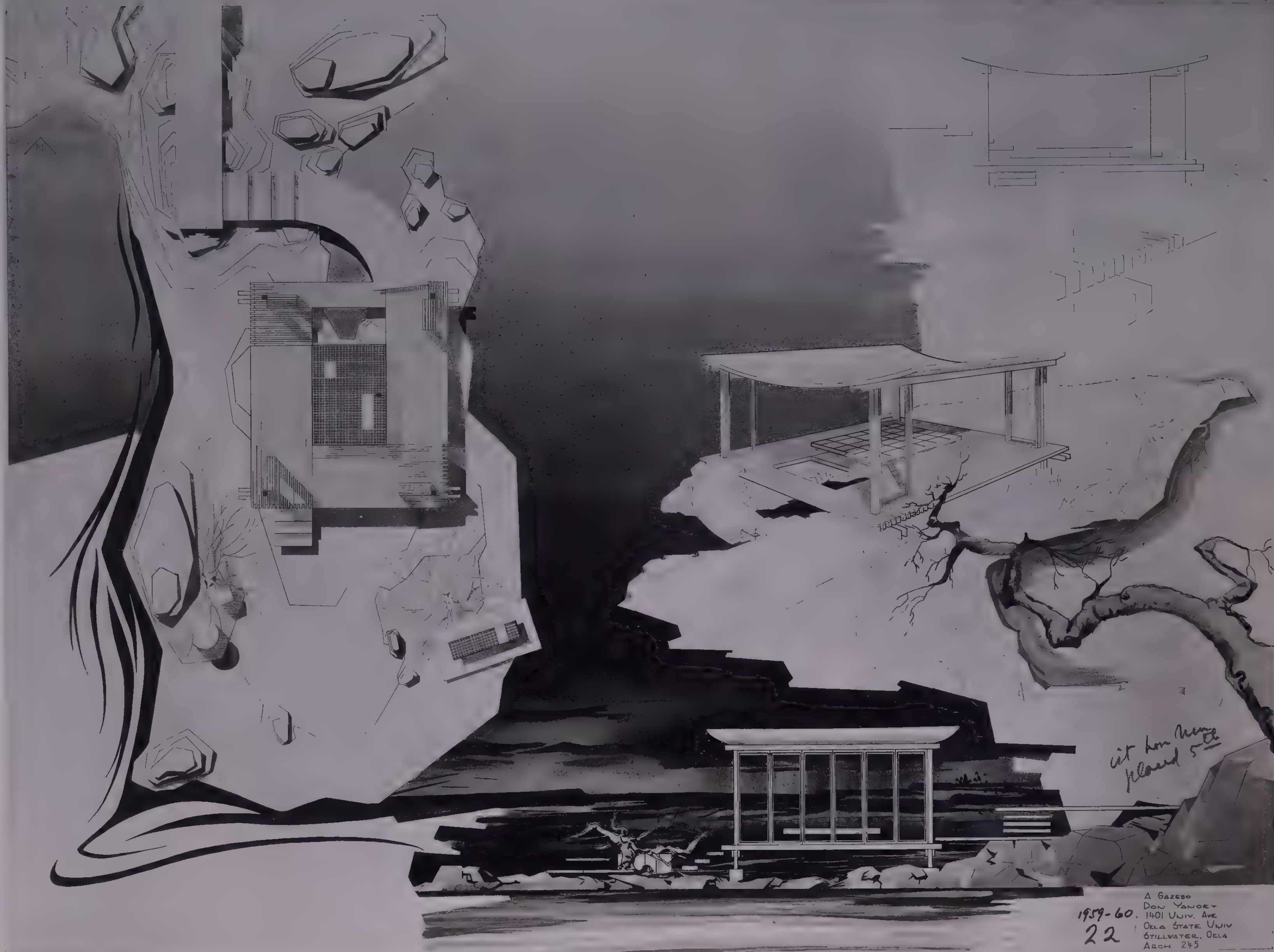

SECTION
a gazebo
1959-60
20

PERSPECTIVE
WEST ELEVATION
PERSPECTIVE
a gazebo
21
21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1959-60.
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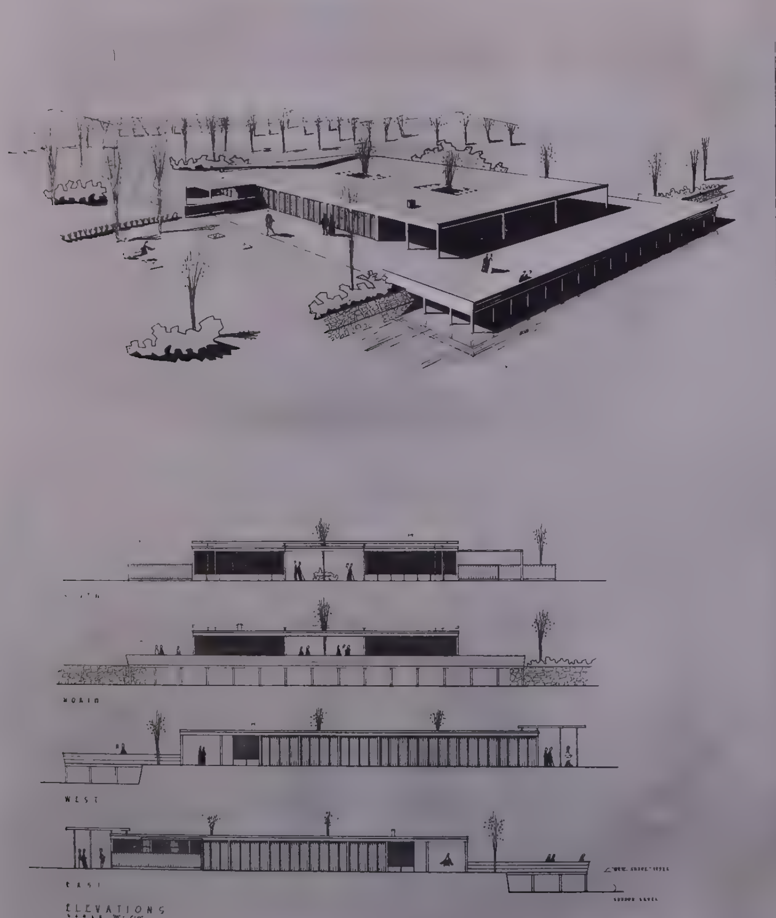
A Gazebo
Don Yancey
1401 Univ. Ave
Okla State Univ
Stillwater, Okla
Arch 245

E47 ②

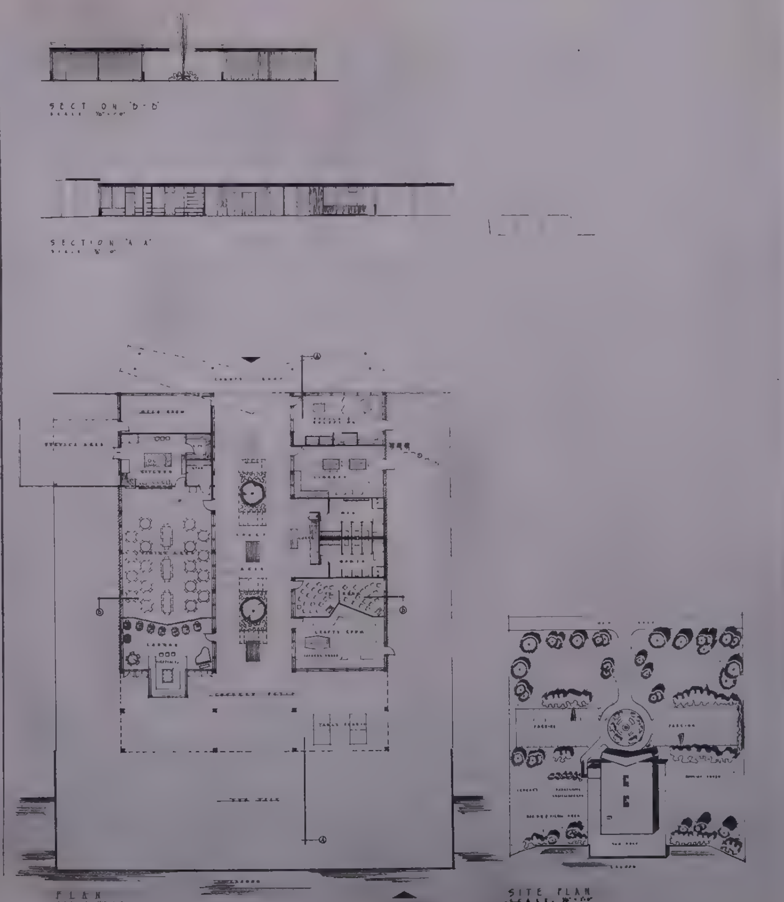


A Recreation Pavilion

1957-58
23

Frank Moolin
Architecture 135
November 10, 1937
"A Recreation Pavilion"
Dept of Architecture
University of Illinois

E47 ①

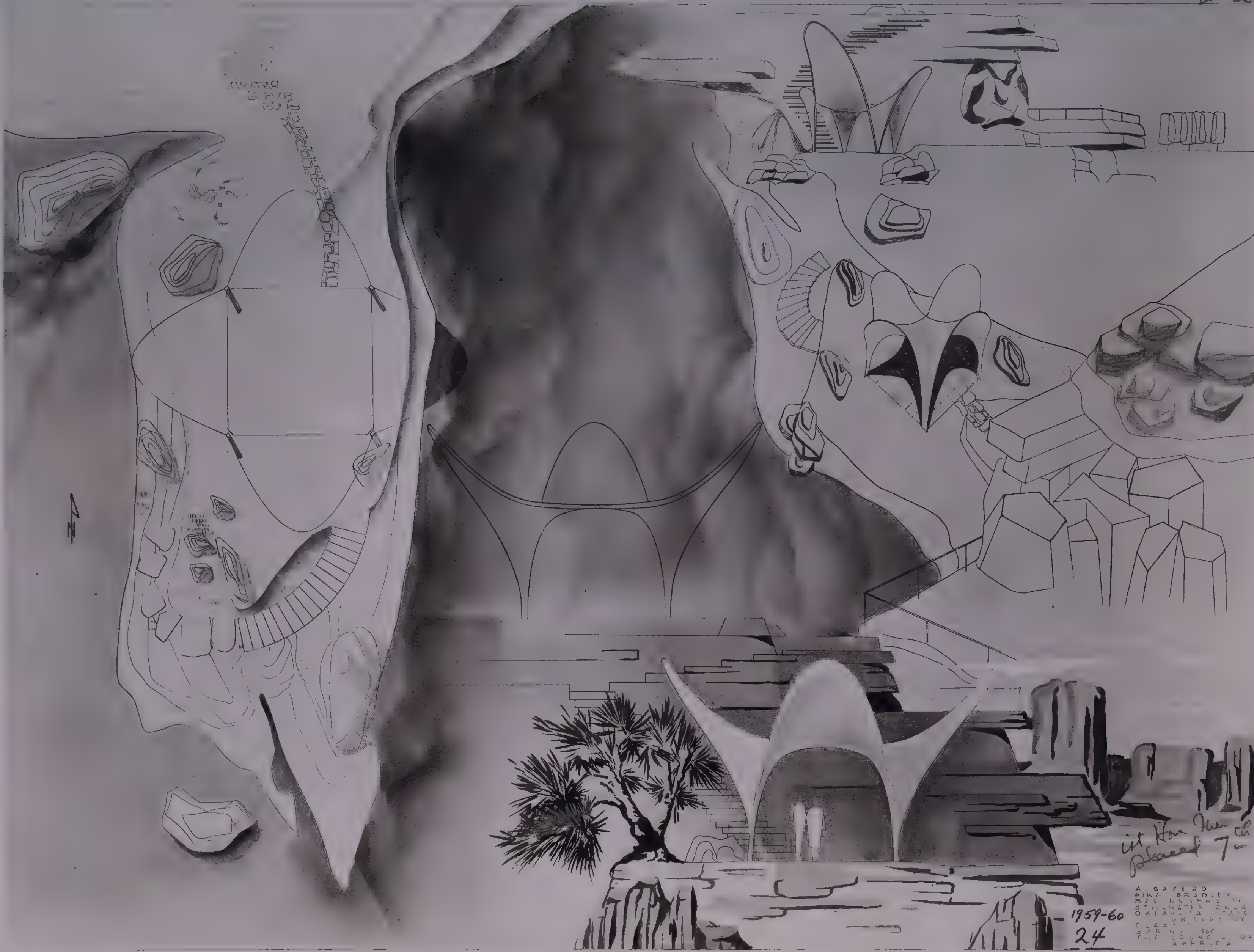


A Recreation Pavilion

1957-58
23

Frank Moolin
Architecture 135
December 10, 1937
A Recreation Pavilion
Dept of Architecture
University of Illinois


PERSPECTIVE
PLAN
ELEVATION
SECTION
PERSPECTIVE
1959-60
23


E 36
1959-60
24
A GAZEBO
MIKE BRADLEY
STILLWATER OKLA
OKLAHOMA STATE
UNIVERSITY
AMERICA

PRING TERM 1959 - 1960 — ELEMENTARY PROBLEM

GAZEBO

ILE COUNCIL OF AMERICA, INC. SCHOLARSHIPS

URY OF AWARD - June 1, 1960

ockwell K. DuMoulin	Caleb Hornbostel	Maurice R. Salo
Villiam D. Grillo	Joseph Judge	Maurice Sornik
oger Heine	Sidney L. Katz	Emanuel N. Turano

ARTICIPANTS - 50 entries

klahoma State University	University of Notre Dame
niversity of Houston	University of Utah
niversity of Illinois, Urbana	University of Virginia
niversity of Illinois, Chicago	Virginia Polytechnic Institute
niversity of Minnesota	Unaffiliated: Cincinnati, Ohio

WARDS

ONORABLE MENTION

Placed 1st - $500 Scholarship	- L. Blackledge, Oklahoma State University
Placed 1st - $500 Scholarship	- J. L. Chang, Oklahoma State University
Placed 3rd	- J. Sheikhalesami, Oklahoma State University
Placed 4th	- K. Anderson, Oklahoma State University
Placed 5th	- D. Yancy, Oklahoma State University

ONORABLE MENTION - A.K. Henderson, Oklahoma State University
- M. Bradley, Oklahoma State University

EPRODUCTIONS

18 L.K. Blackledge, Oklahoma State University
19 J. L. Chang, Oklahoma State University
20 J. Sheikhalesami, Oklahoma State University
21 K. Anderson, Oklahoma State University
22 D. Yancy, Oklahoma State University
23 A.K. Henderson, Oklahoma State University
24 M. Bradley, Oklahoma State University

EPORT OF THE JURY - BY WILLIAM D. GRILLO

Most contest entries were considered good for first year students, and the amount of time allotted for the problem.

Although in many cases little thought was given to actual construction, the jury felt it would be a difficult problem structurally to support some of the designs. It was also mentioned that as this was a "Tile Council Scholarship" more introduction of tile should have been used in the designs.

The jury agreed that two awards be placed first. One given to L.K. Blackledge, was thought a creative approach to enclosing a basically static geometric shape, i.e. the circle by a somewhat free form structure. Also the approach seemed to incorporate the surprise element of reaching the gazebo and experiencing the entire view.

The other first award given to Janet L. Chang completes the "tray of space" concept, in which the individual exists between two horizontal planes.

The third place award given to J. Sheikhalesami is a simple form, the umbrella, well executed. All seven awards were received by Oklahoma State University students.

SPRING TERM 1959-1960 — INTERMEDIATE PROBLEM

A COFFEE HOUSE ON THE LEFT BANK

KENNETH M. MURCHISON PRIZE

JURY OF AWARD - June 1, 1960

Ronald Allwork	Morris Lapidus
Daniel Chait	Harvey G. Matheys
E. James Gambaro	Thorne Sherwood
Paul Lampl	

PARTICIPANTS - 33 entries

Iowa State University	University of Notre Dame
Oklahoma State University	University of Utah
University of Houston	Unaffiliated: New York, N.Y.

AWARDS

HONORABLE MENTION

Placed 1st - 1st Prize, $100	- J. P. Cassidy, University of Notre Dame
Placed 2nd - 2nd Prize, $50	- A. Brunken, Oklahoma State University
Placed 3rd	- M. Photiades, Oklahoma State University
Placed 4th	- S. W. Yip, Oklahoma State University
Placed 5th	- B. L. Wright, Oklahoma State University

HONORABLE MENTION:
- G. H. Fisher, Oklahoma State University
- P. D. Franklin, Oklahoma State University
- R. S. Frisbie, Oklahoma State University
- J. Hargis, Oklahoma State University

REPRODUCTIONS

25 J.P. Cassidy, University of Notre Dame
26 A. Brunken, Oklahoma State University
27 M. Photiades, Oklahoma State University
28 S.W. Yip, Oklahoma State University
29 B.L. Wright, Oklahoma State University

JURIFICATION (IN BEATNIK) — BY CLIFFORD (THE MAN) SMITH

Man, like, we dug the KMM gigs - dug the blowing - dug the groovy line work. But man was that program ever rigged. I mean, like, man, what cat ever had that kind of bread. Like that type of problem is never for real.

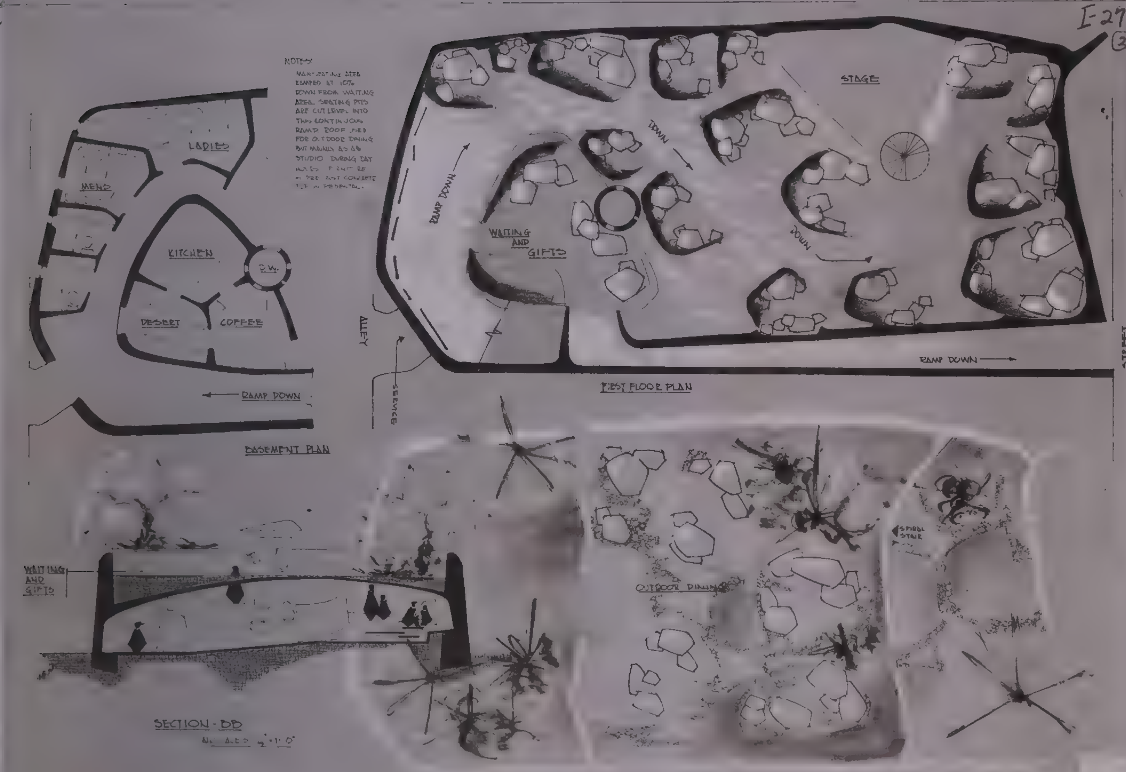
I have no intentions of wrecking this goof before we weave man, so let us take a careful look at the Ray-gun reality.

In general, most of these Architectnicks didn't swing man. They, like, were making it with the soda joint sceen and goofing in the most square groove. Like if these cats had made - like any real sceen at all and dug like, Miles or Monk or Corso or SOMETHING, Man they might have got the picture like I don't want to put no one down but like even they didn't dig the atmosphere. I mean they didn't even feel the space. Either in the pad or in the garden. I mean like if

25

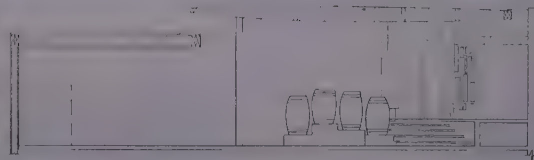
J P CASSIDY
D 2-19-60
COFFEE HOUSE

E-27



COFFEE HOUSE

II-7



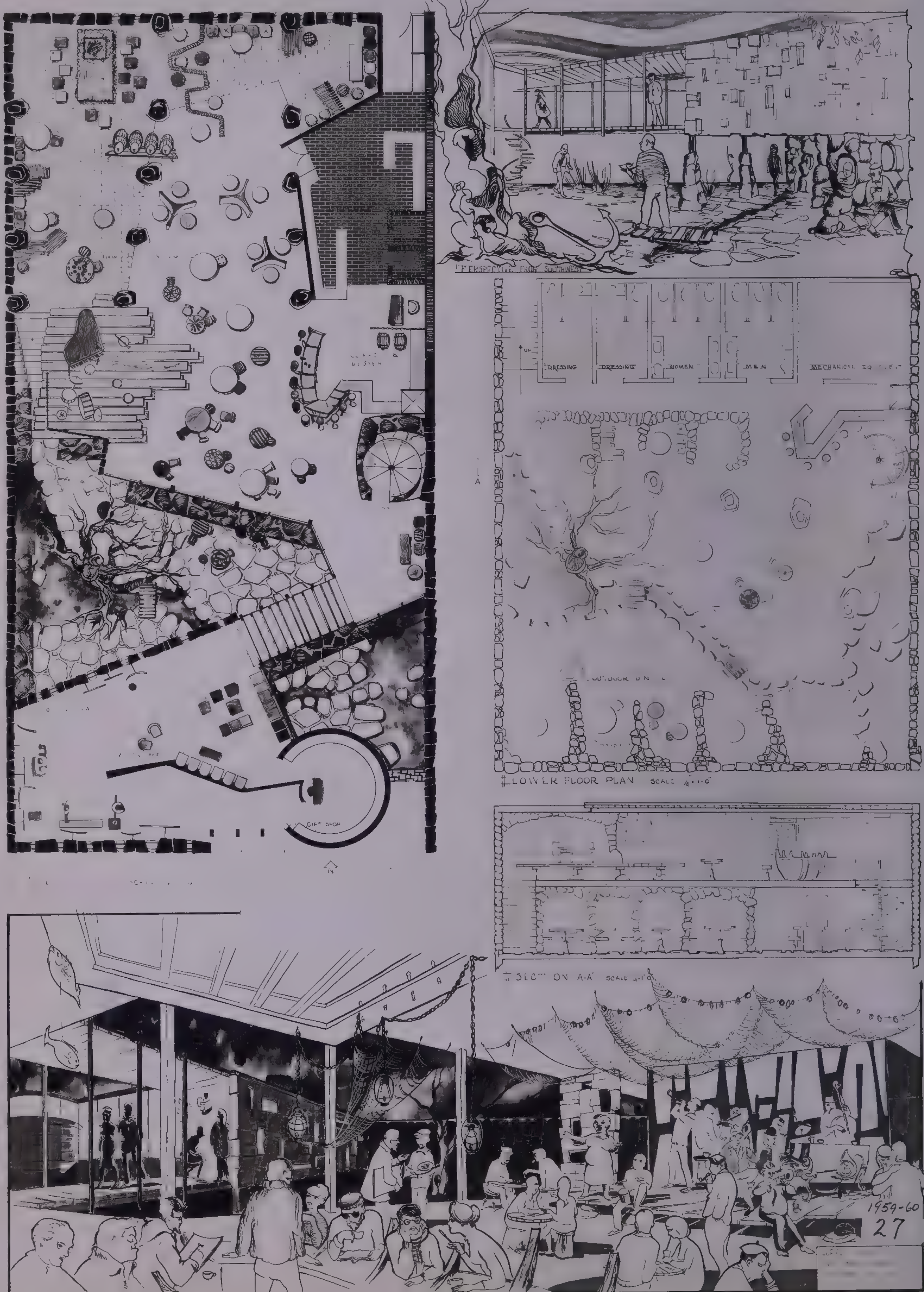
SECTION AA

PERSPECTIVE FROM STREET

1959-60
26

" COFFEE HOUSE ON THE LEFT BANK "
K. M. MURCHISON PRIZE
KLAHOMA STATE UNIV.
ALAN BRUNKEN
2 B THATCHER

I-2


GIFT SHOP
PERSPECTIVE FROM SOUTHWEST
DRESSING
DRESSING
WOMEN
MEN
LOWER FLOOR PLAN
SECTION ON A-A'
1959-60
27

1-7
STORAGE
BOILER
DRESSING
DRESSING
MEN
WOMEN
BASEMENT PLAN
EXTERIOR PERSPECTIVE
SECTION A-A
OUTDOOR DINING
EXHIBITION
GIFT
WAITING
FIRST PLAN
INTERIOR PERSPECTIVE
1959-60
28
A COFFEE HOUSE
K. H. MURCHISON PRIZE
OKLAHOMA STATE UNIVERSITY
STILLWATER OKLA.

KITCHEN
DESSERT
COFFEE
MECH EQUIP
DRESSING
DRESSING
WOMEN
MEN
WAITING
GIFT SHOP
ART
OUTDOOR DINING
LONGITUDINAL SECTION

1959-60
29

oncluded from page 72)

meone was blowing inside the chicks and cats in e garden wouldn't be able to dig at all except each her - but the JAZZ just wouldn't reach them. And en man the chicks waiting would be so screwed with ich a lack of planning they'd never last the night.

he Main Loot went to that crazy groove with the mp and niches - like a real cave. The garden on e roof and the gallery was cool and we dug this e most.

The next two loot winners were like difficult, man, I mean like they both had good plans and open spaces and very groovy proportions. The plan with the bridge cooled and the third winner didn't make second on account of his uncool roof - but made it with the dining alcoves.

All told we had a ball and winked our dings at the line work, like I said first.

EPORT OF THE JURY — BY DANIEL CHAIT

he submissions for the 1960 Kenneth M. Murchison rize delighted the jury with the generally high level f imagination and draftsmanship shown. The pro- ram itself, however, was obviously aimed at making e student attack the problem with an unconventional pproach. The "fun" idea was apparent from the ongue-in-cheek quality of the philosophical preamble s well as from the selection and requirements of the rogram itself - for what architect has ever had a eatnick entrepreneur as a client, and by the pre- epts stated, the very conception of the desire to rect a coffee house would become its realization; he effort to achieve it by the gesture of designing ne a mad fantasy.

n general, too many of the submissions reeked of a ommercial soda-fountain small restaurant air. One ight expect a service of cottage cheese and carrot alad (well-done), rather than the exotic fare of he well-oriented coffee house. Had the strange trains of esoteric music and poetic ramblings that ould be part of the bill of fare, permeated more of e designs, a freer less constricted result might ave occurred in a greater number of entries. This s not to decry the premiated solutions, and many thers, for a large number of them could not be ccused of the above fault. In many cases it was bvious that a good basic idea fell by the wayside ue to lack of conviction and force in completion long the selected path. The free flow of space was lso lacking -- should it not be possible to "feel" e areas flow and still maintain singular qualities - hould not both the garden sitters and indoor devotees e able to enjoy the music simultaneously? Should n art display nook be shoved off to a side "room" so at the subtle persuasion of easy and apparent circu- ation is nullified? On a more technical level, it was certainly advantageous to be able to serve both garden and dining room from the kitchen without resorting to mechanical dumbwaiters, or in some examples, no means of serving both at all. Since the program indicates unconventionality, would the inmates of the spa feel right in being enclosed in a rigid repetition of modular forms, forced upon them by the monoton- ous rhythms of a pre-selected hexagon, octagon, or other product of the bow compass and triangle?

The first prize design was unanimously selected for its ingenious base of a continuous ramp idea, having periodic "scoop-outs" in which tables were set. Truly a cave. The garden was placed on the roof, in con- text with a split-level sort of parti, thereby freeing large, continuous areas. By means of a tapering passage entrance, the visitor enters the art exhibition and dining areas in the center of the building, rather than at the street. All told, an imaginative, well directed job.

The second and third places were fought over bitterly. Both had good plans, open spaces of easy traffic flow and exceedingly pleasant proportions -- the third dimension (a bridge over the garden, or entrance passage overlooking a dropped dining-room-garden) was used with telling effect, making the narrow and long proportion of the building seem less awkward. A rather prosaic roof arrangement spoke badly for the third place winner, while the small intimate niches for dining received praise from the jury.

All told, the entrants are to be congratulated on more than the designs -- the artistic qualities of the presen- tations would make many of them qualify as extremely pleasing works of art in themselves.

SPRING TERM 1959-1960 — ADVANCED PROBLEM

AN OPERA HOUSE

HIRONS ALUMNI PRIZE

JURY OF AWARD - June 1, 1960

George Bielich
Arthur S. Douglass, Jr.
William Ellis
Jacques Guiton
William B. Heller
Hugh N. Romney
Daniel Schwartzman
Roger Spross

PARTICIPANTS - 25 entries

Pratt Institute
University of Notre Dame

AWARDS

First Prize, $150 - R. J. Reilly, Pratt Institute
Second Prize, $50 - T. L. David, Pratt Institute

REPRODUCTIONS

None.

REPORT OF THE JURY - BY HUGH N. ROMNEY

Sometimes we learn more by our mistakes than when things to along beautifully with many medals and cheers. The judgment of the Opera House was certainly not the latter as the jury really had to struggle to select two solutions worthy of the prizes (no awards were made). So let's see what went wrong.

The students seemed to ignore a definite description in the program that "pedestrians should be able to stroll through the part past the building uninterrupted." Most were unnecessarily complex with long ramps and stairs with poor circulation. Only a few took advantage of the lake, with the restaurant and bar overlooking it, and the wonderful aesthetic value that water gives to a project of this nature. Some of the better concepts took the envisioned public from the auto entrance directly to the main lobby with ample stairs and elevators to the auditoria. Some who gave consideration for the stage, the stage elevators, workshops, etc. forgot about the servicing.

The biggest disappointment was the lack of original ideas. Many rubber-stamped Lincoln Center like madmen even when it didn't apply, others copied the forms of Frank Lloyd Wright or Corbusier.

Whenever this happens, the jury finds itself in conflict. They remember when they were students and influenced by outstanding architects and yet they are looking for a solution that is new and stimulating, removed from the stigma of building codes and economics. The student can learn if he remembers that it is the original concepts and sound thinking that made great architects great, rather than copyists.

The program committee learned from the many unfinished submissions that this was too complex a problem to give in ten days. Perhaps fresher ideas would be forthcoming if only a diagrammatic solution was required and so stated in the program so the jury would be advised. And so we learned . .

The jury felt there had been insufficient study in forms and shapes of auditoria. But there was nothing poisonous about La Scala or the Metropolitan as space references and a great good from "so-called" history. It is unfortunate, however, if the students construed these as shackels to their thinking.

And so we learned . . . .

1960 THESIS AWARD IN ARCHITECTURE

JURY OF AWARD - June 30, 1960

Caleb Hornbostel, Chairman	Jose A. Fernandez	Joseph J. Roberto
J. J. Caponnetto	Sidney L. Katz	Hugh N. Romney
Giorgio Cavaglieri	Victor Koechl	Melvin H. Smith
Arthur S. Douglass, Jr.	John C. B. Moore	Otto J. Teegen

Observers: Kenneth Alexander Smith and Alexander Kouzmanoff

PARTICIPANTS - 9 entries

Columbia University
Rensselaer Polytechnic Institute
Virginia Polytechnic Institute
Yale University

AWARDS

NIAE Trophy - Placed 1st - Ricardo Scofidio, Columbia University
"Graduate School of Modern Arts"
Placed 2nd - J. Robert Ferguson, Virginia Polytechnic Institute
"United States Embassy, Cambodia"
Placed 3rd - E. Kremer, Rensselaer Polytechnic Institute
"A Shakespeare Theatre for Central Park"
Placed 4th - P. Lippman, Columbia University
"The Museum of Primitive Art"

REPRODUCTIONS

# 30	Ricardo Scofidio, Columbia University	(2 plates)
# 31	J. Robert Ferguson, Virginia Polytechnic Institute	(1 plate)
# 32	E. Kremer, Rensselaer Polytechnic Institute	(1 plate)

REPORT OF THE JURY - BY MELVIN H. SMITH

The jury awarded the NIAE Trophy and First Place to Ricardo Scofidio of Columbia University. His thesis was "A Graduate School of Modern Arts for Columbia University". His program included two theaters as well as many studios for the various arts. The jury felt that the solution, to the complex problem of integrating all these areas into one building block, was well thought out and that the result was bold, sophisticated and architectural. Particularly interesting was the way in which the two theaters and their stage houses were contained back to back in the mass. The floating painting studios on top of the basic block were an interesting innovation. The criticism of the building was mainly concerned with the elevations and the courtyards. It was felt that the end elevations were quite awkward and that the form implied a cantilever, yet it was belied by the applied columns on the long facades.

Second Place was awarded to J. Robert Ferguson of Virginia Polytechnic Institute on his thesis for "United States Embassy for Cambodia". The drawings and written part of the thesis were handsomely presented and included a particularly fine perspective. The jury felt that the court scheme was pleasant and reasonable, but they questioned the somewhat "motelish" look of the building. In particular, it was felt that the building lacked the grandness of scale expected of an American Embassy. The section was interesting but the fenestration and the main entrance were inconsistent and out of character with its general feeling. (concluded on page 77)

THE AMERICAN WAY OF LIFE

BY EDWARD DURELL STONE

Bill Pahlman once asked me to speak on the American way of life. Since by now I lived quite a bit of it up, and I am among friends, you might enjoy some personal biography.

I was born around the turn of the century in a small town in the Ozark Mountains. The Baptists would say a community of 5,000 souls. Although its name is Fayettsville the country people always call it the "Athens of the Ozarks" as the state university is located there.

My grandfather had settled that corner of the state and was an acquisitive old gent and soon owned the land as "far as the eye could see". He had five sons whom he educated and it was his wish to educate them and leave them in a position where they would never have to worry about money. They never did!

My Uncle Will studied medicine at John Hopkins, came home and operated on a patient who unfortunately died. He, too, became a philosopher and a learned authority on medicine.

Uncle Albert, for instance, went to Yale to study law. He returned but found that he was much more interested in the affairs of the Roman empire than he was in the more mundane practice of law. He was given to drinking with the local philosophers and had a saddle horse named Hobson after the Spanish American war hero. Hobson would take him to the philosophical rendezvous, and Uncle Albert would be assisted onto Hobson at the conclusion of the evening, the horse knew the way home. I cite this as an example of the simplicity of the American way of life fifty years ago. You can imagine the legal complications if he had to come home in a Chevrolet.

My father was sent to the University of Virginia and he devoted his life to objective meditation and became, in effect, the local encyclopedia.

So that I was raised in a relaxed life among lotus-eaters, and someone has described my environment as a hotbed of tranquility. They did not have to catch me to put shoes on me when I went to school - I simply went to school barefooted. The first automobile in town was kept in our barn and looked exactly like the buggy even to the whip-socket. This was my first introduction to the mechanical, scientific twentieth century.

So I have been through the horse and buggy, the automobile, the air, the jet, and the atomic age, and if the insurance tables are accurate there is life left in me yet.

Now to cope with the marvels of our age from Lenin to Lanolin and golden oak to chrome tubing and from Hobson to jets I've had to work out certain rules for myself that enable me to be carefree and barefoot in the atomic age. I will gladly share these rules with you. You may think of them as Stone's Don'ts.

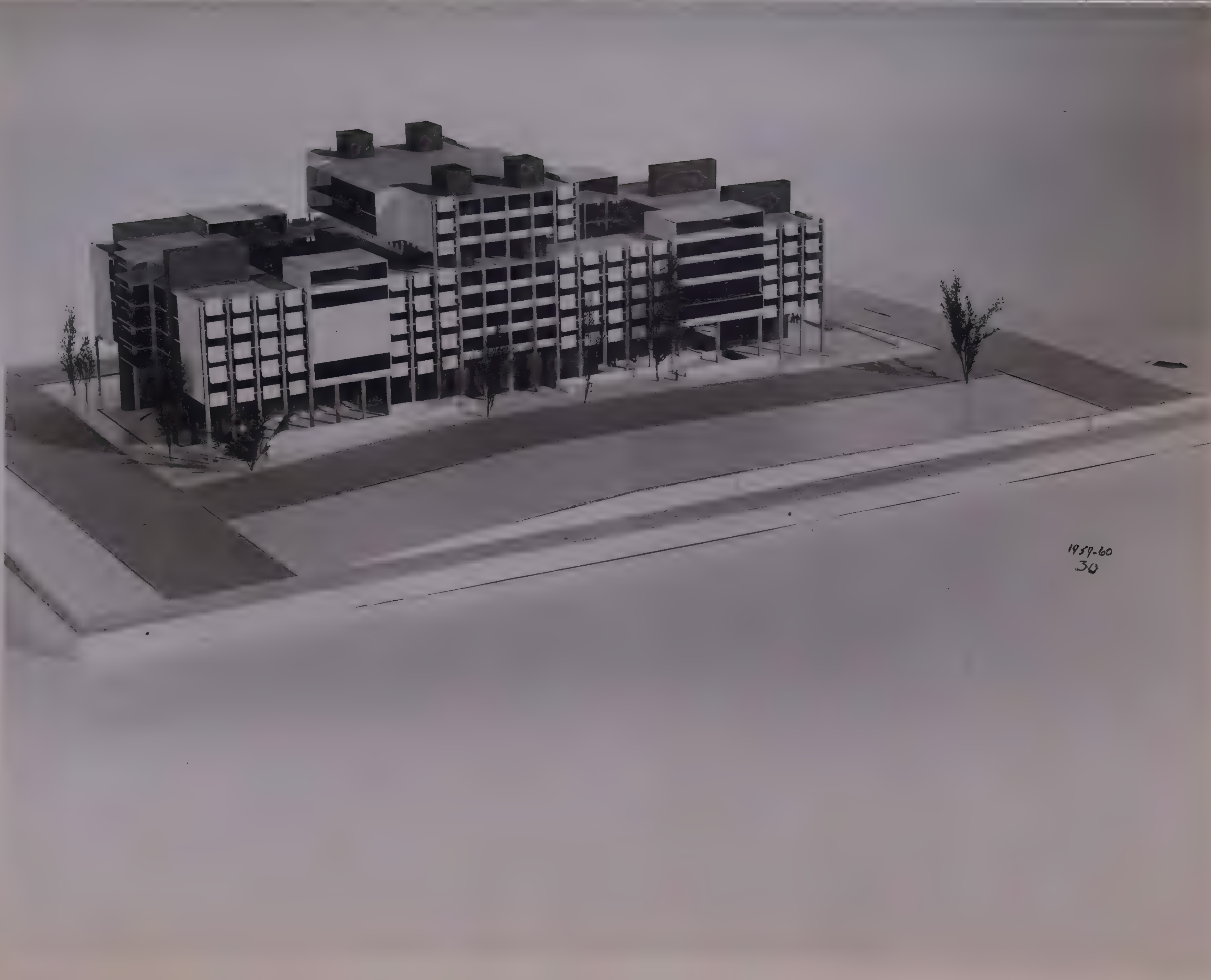
One. Don't work too hard. If you find that you do not have enough ideas in an eight hour day, the chances are your soul needs therapy. You are in need of inspiration, and for that you should look into the eyes of the woman you love, or go to Chartres Cathedral and see the sunrise through the beautiful stained glass windows or sit among the flowers in your garden.

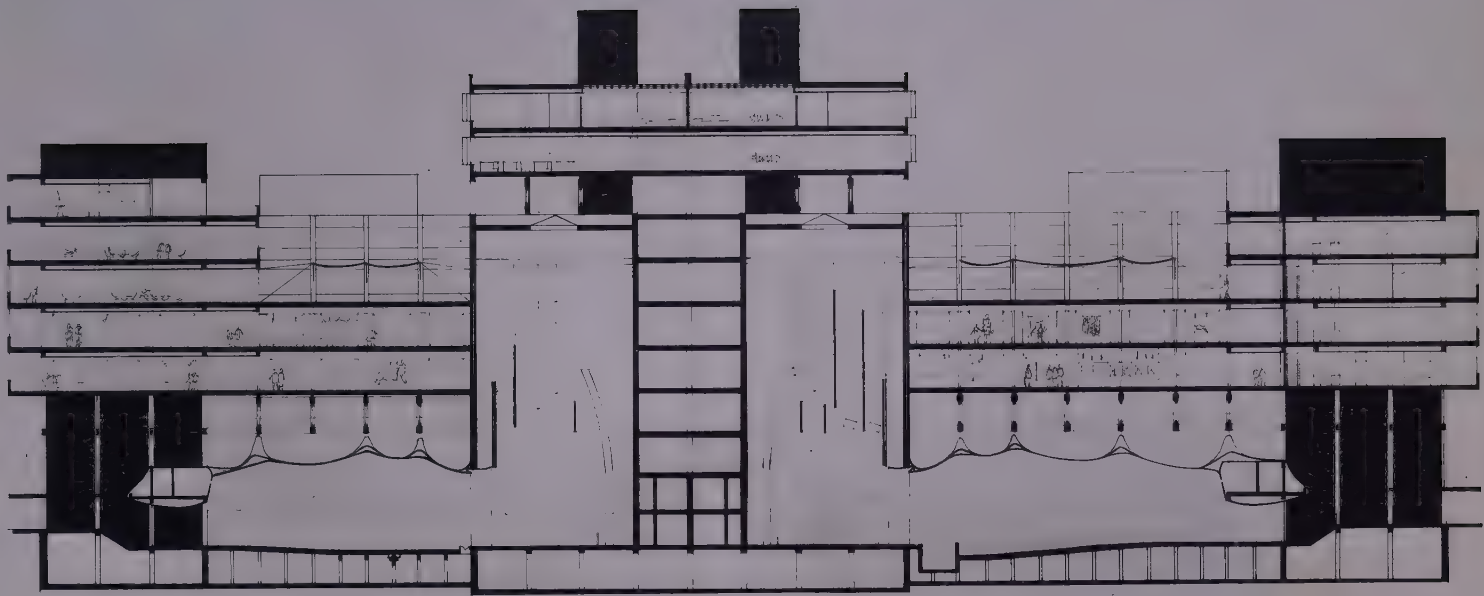
Two. Beware of Progress. Progress invariably means that you sacrifice something good for something less attractive. A simple example: twenty year ago we had living rooms twenty by thirty; now you can only tell a room from a closet by the hook-strip on the wall. On a Sunday afternoon when you are trying to get back to New York in your car and you are in a traffic jam this is a good time to reflect on whether progress is really paying off.

Three. Don't be Modern. Being modern simply consists of closing your mind to 2500 years of wester culture and proving yourself content to copy the next-door neighbor's glass building, house, chair, drapery and poodle clip. I have two tests by which you can readily determine whether you are modern or not. If you prefer a bent chrome chair to a rocker or a cadilac to a horse-drawn carriage you need therapy. If you are a pulp writer, it doesn't hurt if you know Shakespeare. Remember too that Chippendale was handy with wood.

Four. Go to Bat for Beauty. If we don't, we're goin to find flashing neon signs on the pearly gates when we get there. If a few militant dames can sell this countr prohibition we certainly should be able to do away wit neon signs, billboards, roadside honky tonks and used car lots.

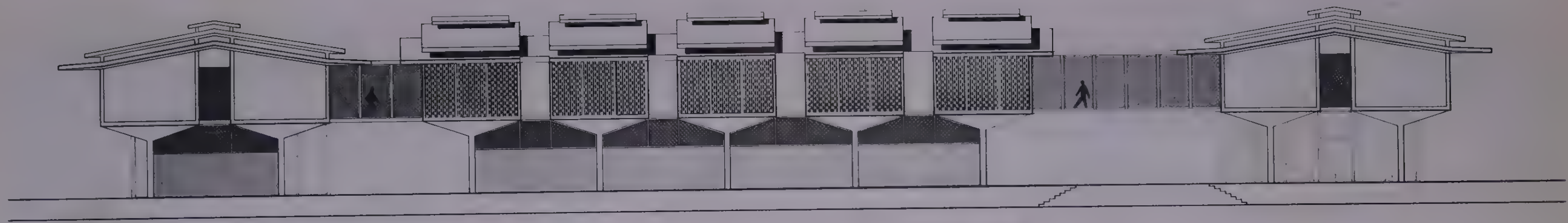
Five. Don't Fall in Love with Just Your Idea. If you are jealous of your ideas it is a sign you have too few. Keep an open mind, the janitor's suggestion is probabl the best.


1959-60
30



longitudinal section

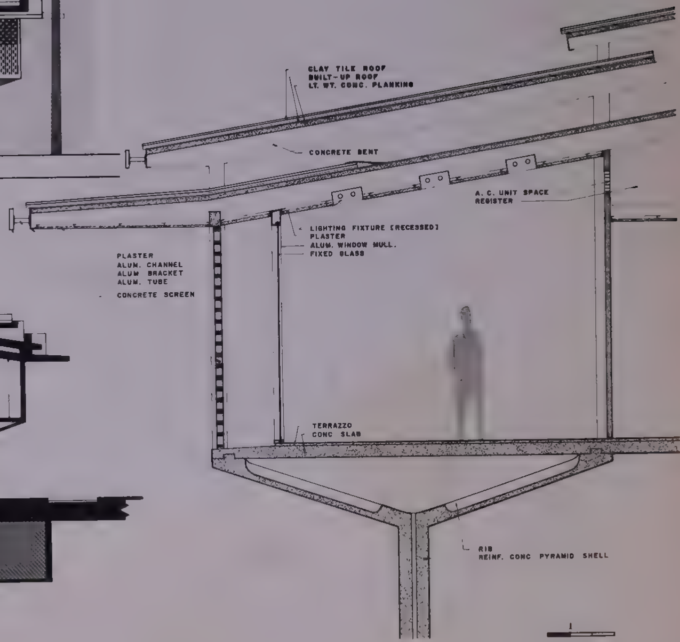
1959-60
30



FROM RUKHAK VITHEI SAMDECH PAN

FROM MOHA VITHEI PREAH NORODOM

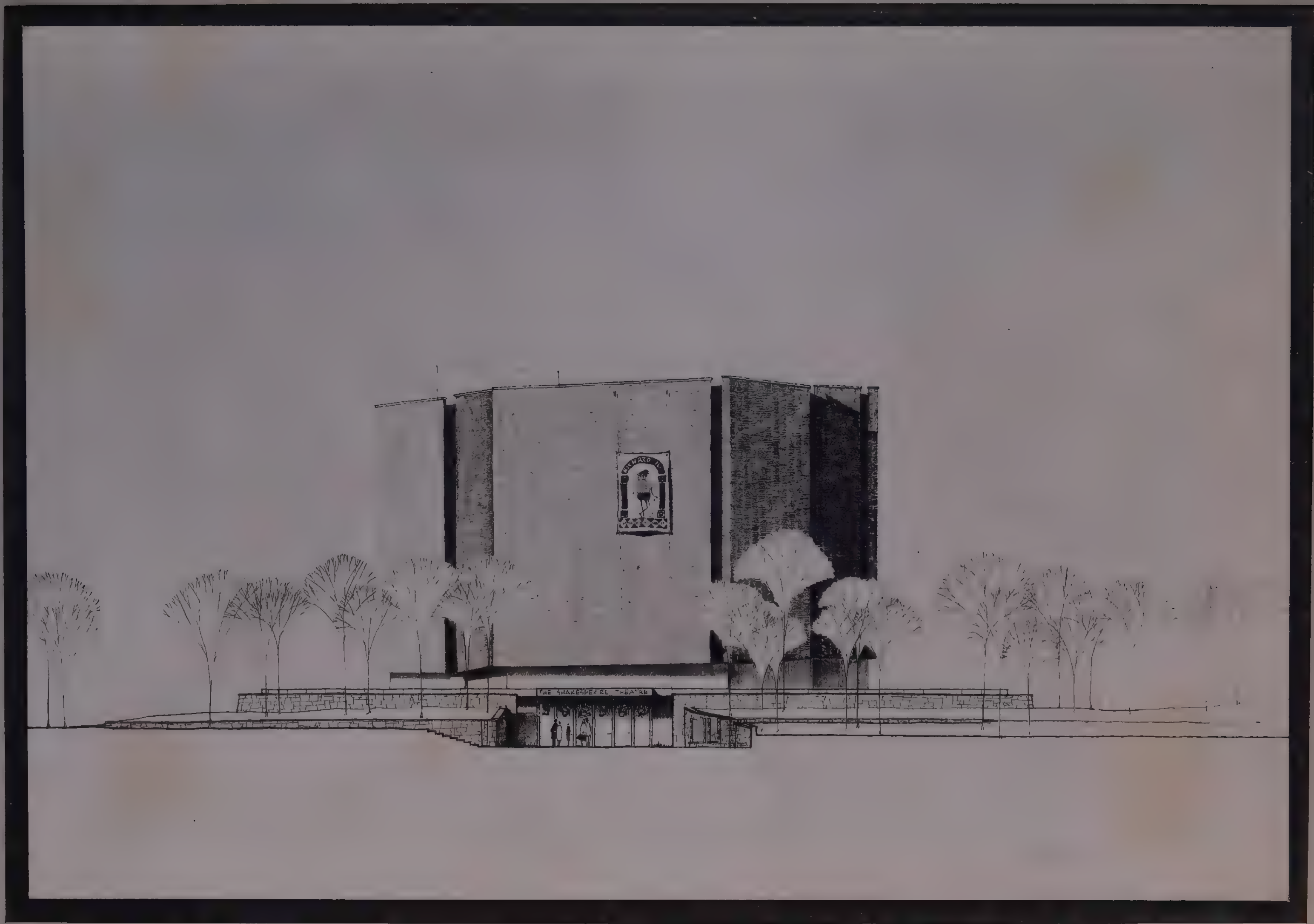
SECTION A—A



1959-31

6

UNITED STATES EMBASSY · CAMBODIA



a shakespeare theatre in central park   entrance elevation 1/8"=1'   thesis '60 e kremer

1959
32

Six. Don't Get in Trouble. This fortunately is the easiest of all and simply involves avoiding certain people: the landlord, the doctor, the dentist, the psychiatrist, intellectuals, morticians, and beatniks.

Seven: Don't be a Money-Changer in the Temple. If you're an artist you've earned the right to starve with dignity.

Eight. Don't Talk Back to Your Wife because she is smarter than you are. H. L. Mencken said in the twenties that no man would make any decision without first talking it over with his wife, because she was a creature of super intelligence. If I had listened to him I would have saved myself some twenty-five years of exhausting research.

Nine. Don't be too Worthwhile Always keep a few character defects handy. People love to talk about your frailties. If you must be noble keep it to yourself.

I Do Not Wish That the frivolous nature of my comments detract from our purpose which I believe to be worthy. It is our obligation to create an environment of beauty and a cultural heritage worthy of our generation, and good enough to permit future generations to enjoy it with pride.

REPORT OF THE JURY - (concluded from page 75)

Third Place went to E. Kremer of Rensselaer Polytechnic Institute on his thesis for "A Shakespeare Theatre in Central Park". It seemed to the jury that Mr. Kremer had found a good solution to a unique problem, that of creating an Elizabethan theater for a contemporary stagecraft and audience. The jury as a whole, liked the interior design of the theater, although it recognized that the section could not actually work. There was some criticism of the facades which, although echoing some of the existing stone park structures near it, seemed stark and awkward in the park setting; while the interior space was not clearly related to the exterior form.

Fourth Place was awarded to P. Lippman of Columbia University whose thesis was "The Museum of Primitive Art". The jury felt this was a most interesting complex of buildings which recognized the difficulties of the site in the variation in grades and utilized this to great advantage in the multi-level solution, providing most interesting exhibition areas.

"TURNING POINT"

We have just heard of a business correspondence that illustrates either a new high in commercial candor or a new high in commercial duplicity. It seems that an architect with an international reputation, who is living at present as professor emeritus on the campus of an Eastern American university recently designed a house for a client, and that after moving into it the client complained that the heating plant was inadequate for year-round occupancy.

The architect saw to it that another plant was substituted, this one selected on the enthusiastic recommendation of the salesman who had talked him into the original heating unit. It proved to be no good, either, and the architect, in a swivet, wrote to the manufacturer of the plant, outlining its dismal drawbacks. In due course, he received a lengthy reply, which wound up, "I am surprised that a man of your training and mental capacities should place such reliance on the word of our salesman."

NAMES! · NAMES! · NAMES!

BY ISAAC ASIMOV

(Reprinted by permission of Columbia Publications)
("The Original Science Fiction Stories")

In 1954 and 1955, three elements were discovered, with atomic numbers of 99, 100, and 101. To be precise, they were manufactured. We can imagine an infinite number of elements if we suppose more and more particles crammed into the nucleus. In a practical sense, though, we are now approaching the limit. Each new and more complicated element is harder to put together and breaks down more quickly. In the case of element 101, exactly seventeen atoms were manufactured and those lasted only a few hours.

These three elements, then, represented nearly the last chance chemists might have of immortalizing something or somebody through the name of an element.

The result was good. Element 99 is now einsteinium, element 100 is fermium and element 101 mendelevium. Einstein is no news to anyone in science fiction, writer or reader. Fermi was one of the leaders in the development of controlled fission. Mendeléev first developed the periodic table of elements in its modern form. By using that table he predicted the existence and properties of three new elements, and lived to see those elements discovered and his predictions verified.

In addition, element 96-first manufactured in 1946 - is called curium after Pierre and Marie Curie, who first discovered short-lived radioactive elements and who invented the term "radioactivity".

But, alas, not all the elemental names reward and honor achievement so fittingly. The chance to do so has been lost. The discoverer of an element is, by convention allowed to name it at whim. As a result, the names of the one hundred and one elements are a weird collection of memoria to national pride, muthological allusions, first impressions, genteel swearing, trivia, and even chemical errors.

For instance, of the one hundred and one elements, exactly six have been named after people. I have already mentioned four, all of them unstable elements that do not occur in nature. But two elements remain, stable ones that do occur in nature. Who, then are the lucky gentlemen who stand alongside the giant names of Einstein, Fermi, Mendeléev and Curie.

Well, it seems that back in 1794, a Finnish chemist named Gadolin found a new kind of mineral in Sweden near a small town I will have occasion to mention later on. He named it after the small town and, having done so, passed out of chemical history as far as I know.

But then an astonishing thing happened. In the century from 1803 to 1907, a series of fifteen elements - with atomic numbers from 57 to 71 inclusive - were discovered, one after the other, in this mineral or others like it. These elements are referred to as the "rare-earth elements." In 1880, the ninth one, element 64, was discovered, and the discoverer in casting about for a name, remembered that Gadolin had first described the mineral that contained these elements. Element 64 became gadolinium.

If you think Gadolin is rather obscure to be so honored when so many of the greatest are not, consider this:

Element 62 is samarium. Most of my life, I somehow had the vague notion it was named after the good Samaritan, but of course it isn't. Samarium is called so only because it was found first in a mineral called "samarskite". And going one step farther, samarskite got this name because a sample of it was originally found in Russia in a region under the jurisdiction - minerologically speaking - of a Russian mining engineer named Samarski. Of such accidents may deathless fame be manufactured!

Of the seven people honored elementally - remember, curium is named after two people - it so happens that none is a native-born American. By birth, one is German, one Italian, one French, one Polish, one Finnish and two Russian. Einstein and Fermi, however, ended their lives as American citizens.

Places are better represented than people among the elements, but often in unrecognizable form. The cult of classicism is strong in scientific nomenclature, a hangover from the days when Latin was the interna-

tional language of learned men. Consequently, no one used the real name of a city or country if a Latin name was available. If one wasn't available, a Latin name was made up.

It is for this reason that, if I told you that the largest city to be memorialized by the name of an element was Paris, France, you would probably be unable to find the element in question. You will find no "parisium" listed in the table of elements. However, you will find lutetium, which is element 71 and the last rare earth to be discovered (1907). You see, there was a miserable little village in ancient Gaul on the site of modern Paris and the Romans called it Lutecia

The discoverer of lutetium was a Frenchman, hence the honoring of Paris, but it was the Scandinavian are that was really blanketed. Scandinavia was rich in the ores that contained the rare-earth elements so even non-Scandinavians turned to that northern peninsula for inspiration.

Take holmium, element 67, for instance. It was also discovered by a Frenchman - in 1879 - but he named it after Stockholm. Stockholm has no Latin name, so he made one up: Holmia. The same chemist in the same year discovered thulium, element 69. This time Thule was the place-name used. To the Romans , Thule was a mysterious island in the far North, supposedly the extreme northern limit of land. It has been identified by some with Ireland and some with Iceland, but the discoverer of thulium took Thule to represent the Scandinavian peninsula and named the element accordingly.

This gave Scandinavia a double-barreled victory, for in the same year element 21 was discovered and named scandium after guess what.

A case similar to holmium is that of element 72, discovered in 1923 by a pair of Danish chemists who named it hafnium. From the nationality of the discoverers, you may be able to guess the source of the name, which is Copenhagen. They used the made-up Latin name of Hafniae.

No other large cities are found among the elements, none of the world metropoli. But there is a little city that has not one, not two, but four, count 'em, four elements named after it. Not exactly a city or even a town either; not even a dot on any map I've ever seen. I have a tremendous atlas at home with a tremendous gazetteer thereto attached and in the years I have had it, there are only two towns I ever tried to look up that I couldn't find. One is my birthplace, Petrovichi, which is somewhere in Russia, and the other is this village with four elements named after it.

It is called Ytterby and is in Sweden, somewhere near Stockholm, as best I can gather. It was near Ytterby that Gadolin found the mineral which was the starting source for the rare-earth elements. He called the mineral "yttria" after the town. When chemists later found they could divide yttria into two fractions with different chemical properties, they called the fractions "erbia" and "terbia", still after the town. In 1843, when the mineral yielded three new elements - two of them rare-earth elements - they proceeded to call one yttrium (element 39), the second erbium (element 68) and the third terbium (element 65). Then, in 1878, when element 70 was found, chemical invention could go no further than to pick on Ytterby again and the element was named ytterbium.

There is another little town, this time in Scotland. I can't find its population, but at least I can find it on the map. It is Strontian in Argyll Country on Loch Sunart. A particular mineral was first discovered in a lead mine near Strontian in 1790 and called "strontianite." In 1808, when element 38 was discovered in that mineral, the name chosen for it was strontium.

Several nations are honored. In 1875, a Frenchman discovered element 31 and named it after France. Only, as was almost obligatory, he took the Latin name for France which was "Gallia" and there is the element: gallium. (As it happened, in 1939, other Frenchmen discovered element 87 and they honored France under its proper name, calling the element francium. France almost made it three-times-honored, too, since on two different occasions, "celtium" was proposed as the name of an element after the Gauls, who were Celts, you know. Both times, however, the element in question turned out to be already known and already named something else.

In 1886, a German discovered element 32 and decided Germany was worth an element as well as France. In his language, Germany is called "Deutschland," but in Latin, it is "Germania." He didn't hesitate. The element is known as germanium.

When the Curies discovered the first known short-lived radioactive element, they decided to honor the birthplace of Marie Curie, which happened to be Poland. That is why element 48 is polonium.

After studying the list of elements, you may not believe it, but Russia is also included. In 1955, a

German chemist discovered element 44. He extracted it out of an ore that had been dug out of the Ural Mountains. Russia was a natural, but he used an old-fashioned Latin-sounding name for it, Ruthenia. The element is ruthenium.

In 1925, German chemists discovered, or thought they discovered, two new elements, 75 and 43. With fine impartiality, they named one for the west (of Germany) and one for the east (of Germany). Element 75 was named for the Rhineland and called rhenium. Element 43 was named for Masuria, a district in East Prussia - now part of Poland, by the way - and called masurium.

However, masurium didn't stick. It turned out the discoverers were mistaken. Although masurium was listed in tables of the elements for fifteen years - usually with a question mark - it washed out in the end. Element 43 is radioactive, comparatively short-lived. None exists in the crust of the Earth. In 1939, samples of it were manufactured in the laboratory and it received a new, and now official, name. Masurium, therefore, is one of the "phantom elements."

Place-names reminiscent of classical times also occur. One of these is a district in Thessaly, an area in Northeastern Greece. The district was named Magnesia. A white mineral found there was known to the Greeks as "magnesia lithos" (Magnesian stone). In 1808, element 12 was found to occur in Magnesian stone, so the element was named magnesium.

Magnesia was commemorated in still another way. A black mineral was found there which had the odd property of attracting little bits of iron. The Greeks called this mineral "magnes" and from that our own world "magnet" was born. (The Magnesians of Thessaly, by the way, established a colony in Asia Minor which, out of unimaginative nostalgia, they called Magnesia. This creates some confusion as to whether it is the European or the Asiatic Magensia that is being honored.)

The story doesn't quite end there. The medieval alchemists confused another black mineral - today called "pyrolusite" - with magnes. As they copied each other's words, misspellings crept in and magnes eventually became "manganese." So when element 25 was discovered in pyrolusite in 1774, it was called manganese after a mineral and district with which it had nothing to do. Under proper conditions, you see, even mistaken identity and mistaken spelling can be hallowed.

Much simpler is the case of element 29, a metal very useful to the ancients. The Romans got their supply from mines on the island of Cyprus, so they named the metal after the island and in English the word has become copper.

You'll notice that all the place names, so far, are European. In fact, element 63, discovered in 1901, is named europium.

However, the New World is represented. Most of the artificial radioactive elements manufactured since 1939 were made in American laboratories and by 1944 when element 95 was manufactured, the name americium had become inevitable. Furthermore, most of the discoveries were made at the University of California in Berkeley, California, so in 1949, when element 97 was prepared, it was named berkelium, and when element 98 was synthesized in 1950, it was called californium.

The mention of californium brings to mind the fact that three American states are represented by phantom elements. No less than three. In 1926, chemists at the University of Illinois thought they had discovered element 61 and called it illinium. In 1929 and 1931, chemists at the Alabama Polytechnic Institute thought they had discovered elements 87 and 85 and called them virginium and alabamine. In all three cases, the chemists were mistaken. Elements 61, 87, and 85 are all radioactive and short-lived. They exist in nature, if at all, in undetectable traces. They have all been manufactured now and given new, and now official, names. One of them, element 87, is the francium I mentioned earlier. Element 61 proved a disappointment to another group of chemists as well. Two years before the University of Illinois boys made their report, workers at the University of Florence - Italy - thought they had it and called it florentium. For a while, there was considerable argument about it on strictly national lines, but it was all for nothing. Both groups were mistaken, both names washed out.

An element slipped out of the grip of the United States just a couple of years ago, quite unfairly, too. The story, in its bare essentials, goes like this. Back in the 1600s, Connecticut's first royal governor sent a sample of a novel mineral back to England. In 1801, an English chemist studied the mineral and extracted what he thought was a new element. He wanted to name it after the United States - which had recently become independent - since it was the first element ever isolated from an American mineral. There was no Latin name for the United States

so remembering the poetic name, Columbia, he called the element columbium.

However, there was some argument as to whether columbium was really a new element or just an old element in an unfamiliar shape. In 1844, the issue was settled. It was a new element; element 41. The chemist who proved this gave it a new name. For the next century American chemists called it columbium and European chemists called it something else. In 1949 an international gathering of chemists decided a number of questions of nomenclature and, among other things, decided to make the European name official. The name, columbium, had a forty-three year priority too!

We can end the place-name elements with elements 52, discovered in 1783, which caps the climax by being named after the Earth - after the Latin word for the Earth anyway. The Roman god of the Earth is Tellus, and element 52 is tellurium.

This leads us right into another group of elements. The Earth is not only a place, it is also an astronomical body. Excluding tellurium, there are seven, and possibly eight, elements, elements named after astronomical bodies.

I can begin with the sun and the moon. In 1818, element 34 was discovered. Its properties were quite similar to tellurium, which had been discovered thirty-five years earlier. Since tellurium was named for the Latin god of the Earth, then, by symmetry - remembering that the moon was Earth's faithful companion throughout the eons - element 34 should be named for the Greek goddess of the moon, She being Selene, the element became selenium.

The story of the sun's role in this drama of names is much more dramatic. In 1868, there was a solar eclipse visible in India. A group of astronomers were there for the occasion. For the first time, light from the upper reaches of the Sun's atmosphere - the lower regions being conveniently obscured by the moon - was passed through the spectroscope. A yellow line was observed in a place where no line had ever been observed before as the result of any earthly radiation.

It seemed that the line could only represent a new element, unlike any known on Earth. Since the element was only known in the sun, it was named for the Greek god of the sun, Helios. . The element-which eventually turned out to be number two in the list - was called helium.

It wasn't until 1895 that helium was found on Earth.

Now there's a certain risk in naming an element if you don't know anything about it. Let me explain. The elements that were known to the ancients and those discovered by the medieval alchemists and even the first few discovered in modern times were named any old way.

After about 1750, however, a system was established Elements were divided into two groups, metals and non-metals. The names of all metals - with a few exceptions - were given endings -um or -ium. That sounded nice and Latin, you see. The names of all non-metals - with one or two exceptions - were given endings -on, -en, or -ine. That sounded nice and Greek. (This is with particular reference to the English-language names.)

Now it so happens that most elements are metals. To be exact, there are nineteen non-metals and eighty-two metals. This disproportion was quite noticeable by 1868, at which time there were thirty-five elements with -ium endings as opposed to eight elements with the -on type ending.

Now there was no way of telling from a line in a spectrum whether an element in the sun was a metal or non-metal, if the line were the only information available. Element 2 might have been names "helium or "helion." on a purely random basis, the odds in favor of "helium" were better than four to one, and it was named so.

But long shots come in sometimes. This one did and how. Not only is helium a non-metal; it just happens to be the most non-metallic non-metal that exists. Yet it has the metallic ending, you see. What's more, nothing can ever be done about it. The name, as it is, wrong ending and all, is frozen firmly into the chemical literature.

To pass on to other matters, there was actually a small fad about 1800 for naming elements after newly discovered planets.

The two outermost of the classical planets were Jupiter and Saturn, in that order, Saturn being, mythologically, the father of Jupiter. In 1786, a new planet was discovered still further out than Saturn. To keep the family arrangement neat, the new planet received the name of Uranus who, mythologically, was the father of Saturn.

In 1789, when element 92 was discovered, it was named after the brand new planet and became uranium.

(One hundred fifty years later, this had reprecussions

In 1940, when elements 93 and 94 were manufactured, element 93, which was one past uranium, was named after the planet one past Uranus. This was Neptune and the element became neptunium. Then element number 94 was named after the planet still further out, Pluto, and became plutonium. With that, chemists ran out of planets.)

In 1801, the first asteroid was discovered, followed shortly by three others. The planets being named for Roman gods, the asteroids were named for Roman goddesses and these first four were called Ceres, Pallas, Vesta, and Juno. Therefore, when elements 58 and 46 were discovered in 1803, they were named, respectively, cerium and palladium. (A few years later "junonium" and "vestium" were also reported but these turned out to be mistakes.)

Now for a more complicated case. Element 80 was known to the ancients and the older an element is, the more doubtful is the derivation of its name. In the case of element 80 the name is mercury and it seems beyond question that it is named after the planet, Mercury.

But why? Well, mercury is the only metal which is liquid at ordinary temperatures. If some is spilled, it breaks up into a million droplets that evade recapture. It seems more "alive" than ordinary solid metals that stay in one piece and drop, clunk! Now then, of all the planets known to the ancients - or to us - the one that moves across the sky most rapidly is Mercury, which is the closest to the sun. Why not name the "livest" of the metals after the "livest" of the planets.

This "aliveness" of mercury is reflected in its other common name of quicksilver, where the "quick" part of the name is not a synonym of "rapid," but a synonym of "alive" as in the phrase, "The quick and the dead."

The name, mercury, is probably due to the medieval alchemists who called various metals by the names of the planets for mystic and astrological reasons. The old Roman name for mercury was hydrargyrum, which comes from Greek words, meaning "liquid silver." That has gone out of fashion but remains as a fossil remnant in the chemical symbol for mercury. Chemical symbols are a shorthand used universally in the scientific world by international agreement. Ordinarily, the chemical symbol for an element is the initial letter of its name or the initial letter plus another letter from the body of the name. Thus, the chemical symbol of uranium is U, that of neptunium is Np, of plutonium Pu, and so on.

The two chief languages of modern chemistry are English and German. In several cases the two languages have different names for the same element, but always they use the same symbol. Sometimes the symbol is taken from the English name, sometimes from the German. And sometimes it is taken from neither but from the old Latin name. The English language has named element 80 mercury; the German language calls it "Quecksilber." The symbol used in both languages is Hg, for hydrargyrum.

You may think this is confusing, and it is, at first. It's amazing though, how you get used to it.

Finally, a doubtful case. In 1669, a chemist studying urine, discovered a new substance - which eventually turned out to be element 15 - and out of a most unglamorous substance plucked undying fame. In the form in which he isolated the element, it combined spontaneously with the oxygen of the air so that it glowed visibly in the dark. Consequently, the discoverer named it phosphorus, from Greek words meaning "light bringer."

But there's just a chance an astronomical body may have been involved. The ancients gave the morning star and evening star different names, not recognizing at first that they were only the same planet - Venus - in different portions of its orbit. The morning star was Phosphorus and the evening star Hesperus. There may just have been enough of the alchemist in the discoverer for him to want to associate the new element with a planet, as alchemists usually did. What better name for an element that shines in the dark than that of the morning star?

The heavenly bodies so far mentioned are all members of the Solar System. The stars as such are not found among the elements. "Denebium" and "aldebaranium," after the stars Deneb and Aldebaran, were proposed, but the supposed elements turned out to be mixtures. For a while, the element, lutecium, was known by the alternate name of cassiopeium after a group of stars, the constellation Cassiopeia, but that never caught on and has now gone by the board.

In the list of planetary names, it is difficult, without knowing the history, to tell whether an element is named after a planet or a Roman deity. Uranus, Nepture, Pluto, and Mercury are both planets and gods; Ceres and Pallas, asteroids and goddesses. There are elements, however, the names of which have definitely mythological origins, without possibility of confusion since no astronomical objects have the name in question.

For instance, consider element 73, discovered in 1802. It is a metal which is not acted upon by strong acids. This struck the discoverer as quite remarkable. (Darned if I know why, though; gold and platinum were known at the time and each is even more resistant to the action of acids.)

Anyway, the discoverer thought of Tantalus who, in Greek myth, was condemned to Hades, where he stood up to his chin in water, yet suffered agonies of thirst because every time he stooped to sip, the water-level sank, (hence our word "tantalize.") This new metal, like Tantalus, could stand in acid and yet not "drink", so it was named tantalum,

Element 41 is closely related, chemically, to tantalum, so in 1844 it was named after Niobe, the daughter of Tantalus, and called niobium. This, by the way, is the element that should by rights be called columbium.

Element 22, when discovered in 1791, was remarkable for the way it reacted rather than reverse. Its combination with oxygen was so tight that it held together under an amount of heat sufficient to break up all other known molecules. This grip of giant strength reminded chemists of the giants of Greek mythology, the Titans, so in 1794, the element was named titanium.

In recent years, Greek myths got one more play. In 1947, element 61 was identified among the fission products of uranium. (This was the "illinium" and "florentium" I mentioned earlier.) It appeared out of the atomic furnace of the uranium pile carrying atomic fire with it in the form of radioactivity. The discoverers were reminded of the Green Titan, Prometheus, who brought fire down to Earth from the sun. Element 61 is, therefore, promethium. Another proposed name for this many-named element was cyclonium after the cyclotron, but that didn't make it."

So far, only Greek and Roman mythology has been involved. There are two elements, however, named after Norse deities. Both, naturally enough, were discovered in Scandinavia by Scandinavians. Element 90 was discovered in 1829 and was named after the Norse god of storm and thunder, Thor; hence, thorium. Element 23 was discovered in 1830 and named after Freya, the Norse goddess of beauty. One of her alternate names is, apparently, Vanadis, so vanadium it is.

Finally, two elements received their mythological names with less forethought and more honest swearing. It seems that Saxon miners working in their iron mines came across the ores of elements 27 and 28. Those ores behaved wrong. They didn't act like iron ore, copper ore, or silver ore.

There was only one logical explanation to the aggrieved miners who tried to handle these strange rocks and couldn't. The ore was bewitched; the evil eye had been put on it. And by whom but by the mischievous spirits of the Earth whom the German peasants called "kobolds" (from a Greek word "kobolos" meaning "demon", which also gives us our "goblin"). So in 1737, when element 27 was first studied by a chemist, it was called just about that, cobalt.

As for element 28, to the miners it seemed copper that the devil had transmuted in order to plague honest men. They called it kupfernickel, which is German for "devil's copper." (The "nickel" part being a colloquial term for the devil related to our own phrase "Old Nick.") Kupfernickel was shortened to nickel and that became the official name of the element in 1751.

So if you have a five-cent piece in your pocket, take a good look at it. It may say "In God We Trust" on it, but the coin is named in honor of the devil just the same.

We have quite a few elements named after the minerals in which they are found. I've mentioned some like magnesium and yttrium that were named after minerals that were in turn named after places. Now let's consider those mineral-born names that are not connected with places.

Some very common minerals are involved. For instance, one of the most common and least glamorous components of the Earth's crust is flint, a hard rock. The Latin name for flint is "silex." Consequently, in 1824, when element 14 was found to occur in flint it was given the name silicon. The Germans and French call it silicium, but the element is a non-metal, and they oughtn't to.

A perfectly analogous case involves another common mineral, limestone. The Latin name for it is "calx." Element 20 occurs there and when isolated is 1808, it received the name calcium.

Even water served as inspiration. The Greek word for water is "hydor." Element 1 occurs in water and when that element - a gas - burns, it forms water. Hence in 1790, some years after it was first discovered, it received the name of hydrogen.

The -gen suffix comes from a Greek word meaning "gives birth to." Hydrogen, then, in Greek, means "gives birth to water" which is true enough. Analogously, the Germans call hydrogen, Wasserstoff, meaning "water substance."

Now for a miserable mix-up which I hope I can make clear. There are two common minerals, one of which is called "soda" and the other "niter." Both contain element 11. This element was first isolated by an English chemist in 1807, who named it sodium, after soda. However, the Germans chose to call it natrium after niter. And in one way, the Germans won out. The chemical symbol for sodium, even here in America, is Na, for natrium.

To make confusion worse, niter also contains element 7 and when that was isolated, in 1772, it was given the name nitrogen, meaning "giving birth to niter." So here are two elements with nearly the same name. The Germans, of course, don't call element 7 nitrogen. They call it Stickstoff, meaning "suffocating substance" because nitrogen is the portion of the air we can't use and in which we would suffocate if it were the only component of air. Similarly, the original French name of nitrogen was azote from Greek words meaning "no life." That name dropped out but it still persists as a sort of fossil remnant in organic chemistry where various groups of nitrogen-containing compounds have the stem -azo- in their names. For a while, the French even violated the international conventions of symbols for the elements by symbolizing nitrogen as "Az" for azote, but I checked recent number of French journals and they don't seem to be doing that anymore. They're using the symbol "N" like everybody else.

A close relative of sodium is element 19 and it is the occasion of another mix-up. A certain useful substance was obtained, in earlier times by burning plants, soaking the ash in water, then boiling the water away in large iron pots. The white powder left behind was called by the English farmers "potash" - the ash in the pot. The same substance was called "al-qili" by the Arags, who did a lot of alchemical work during the Middle Ages. Al-qili means "the ash" in Arabic.

When in 1807, the English chemist who discovered sodium also discovered element 19 and found that it occurred in potash, he Latinized the English word, potash, and named the element potassium. The German Latinized the Arabic word and called the element kalium. Once again, the Germans won. The chemical symbol for potassium throughout the world, is K, for kalium.

Now for another monument to a mistake. Element 8 received its name in 1774. This element occurs in air and, in fact, is the part of the air we actually utilize. It occurs in water. It occurs in almost every compound of the soil. It is by far the most common element in the Earth's crust. If one wanted to name it after some substance that contained it, almost any substance, chosen at random would do. The chemist who did the naming, however, did not choose at random. He chose carefully and he was one of the greatest chemists who ever lived. In fact, he is known as the father of modern chemistry. So wouldn't you know he'd be wrong?

He named element 8 oxygen from Greek words meaning "giving birth to sourness" because he thought oxygen was a necessary component of all acids. Alas, it isn't Hydrogen is, but not oxygen. Wrong element!

The Germans went right along with that particular mistake. They call oxygen Sauerstoff, meaning "sour substance."

Error, by the way, begets error. Begin with the erroneous assumption that all acids contain oxygen. It follows that hydrochloric acid - one of the strongest, cheapest and most common and well-known acids — contains oxygen. The old name for this acid is muriatic acid. Now if muriatic acid is treated so as to remove the hydrogen which is also contained in the molecule, a greenish gas is formed. If this gas is dissolved in water once more, muriatic acid is formed once more. Good! Since this gas is muriatic acid minus hydrogen, it must contain some element the nature of which was then unknown - plus oxygen. The oxygen had to be there, you see, by the laws of error. The gas was, therefore, called "muriatic oxide" and all one had to do was to get rid of the oxygen and be left with the new element, which received, in advance, the name murium. However, nothing could split oxygen out of the muriatic oxide and all sorts of work came to nothing. For alas, alas, muriatic acid contains no oxygen. Nor does "muriatic oxide." It was muriatic oxide itself that was the element. For years, the chemists had it and didn't know it.

(Incidentally, the Germans are worse off than we in the case of chemical symbols. They win out in the matter of sodium and potassium, but that's about all. They call nitrogen, hydrogen and oxygen, Stickstoff, Wasserstoff and Sauerstoff, but they have to use the international symbols N (for nitrogen), H (for hydrogen) and O (for oxygen.) Tough on the German kids taking their first chemistry course and wondering why.

Here's another common substance of name-inspirational value. Coal is mostly element 6. The better anthracite grades are almost entirely element 6. The Latin word for coal is "carbo." Add an "n" to get the non-metallic ending, and we have carbon. The Germans call carbon Kohlenstoff for "coal substance" but the chemical symbol is C.

In 1827, element 13 was found to occur in a common astringent mineral named alum (Latin, "alumen"). The name aluminum was inevitable - with the accent on the second syllable. The French, Germans, and also the British all call it aluminium with an extra "i" and the accent on the third syllable in the case of the British and Germans - last syllable, as always in the case of French.

The Greeks called a certain yellow mineral "arsenicon". The Unabridged traces that back through Persian to a Sanskrit word meaning "yellow". There is also a Greek word, "arsenicos," meaning "valient" for what that's worth. In any case, when the alchemists found a new substance in arsenicon - which later proved to be element 33 - they called it arsenic.

Arsenic isn't the only element that traces back to Persian. The Persian word for "white" is "borak." The Persians gave that name to a certain white mineral which we now call "borax". When element 5 was found to be a constituent of borax in 1808, the element was named boron.

The Arabic, or perhaps Persian word for a precious stone is "zerk", "zargun," "jargoon" or something like that. A particular precious stone that reached the west through the Arabs came to be known as a "zircon." Since element 40 was found in 1827 to be a constituent of zircon, it was named zirconium.

Nor is zirconium the only element to boast a jewel in its ancestry. The beryl is a far more precious stone. Transparent green varieties of beryl are known as emeralds and these are among the most valuable gems of all. Element 4 was found, in 1798, to occur in beryl, and so it was named beryllium.

The original discoverer of beryllium, by the way, hesitated about naming it so the editors of the journal in which he reported the find suggested it be called glucinum and for a long time that ran neck and neck with beryllium as a name for the element. In the end it lost out. Glucinum is derived from the Greek word "glykys," meaning "sweet", because some of the beryllium compounds are sweet to the taste.

The name of element 83 offers problems. It was discovered long enough ago to make the origin uncertain. One theory is that it occurred in a white mineral which German miners simply called "weisse Masse" - white mass - which was shorted to "wismat." The alchemists, in Latinizing the name changed the "w" to "b" since "w" does not occur in Latin. Bismat became bismuth, to-day's name for the element. The Germans still call it Wismut, however, retaining the "w".

More certain but also more round-about is the story of a white mineral used in metal-working. When two pieces of metal are welded together, this particular mineral is sometimes used. It melts easily and flows over the ends of the metal pieces being joined, combining with impurities on the metal and leaving nice clean surfaces that fuse together strongly.

The mineral was named "fluorspar." The "fluor" part is from the Latin word "fluere" meaning "to flow." The "spar" was a miner's term for any of a number of minerals, a kind of trade jargòn for "stone". In other words, fluorspar meant "stone that flows." (Compounds such as fluorspar, are generally known as "fluxes," also from the Latin word "fluere.")

In 1886, element 9 was isolated and, since it occured in fluorspar, it was named fluorine.

Most rocks are about as heavy as aluminum. Occasionally, one comes across rocky minerals that are twice as heavy as ordinary rock and they are often named with that in mind. One such mineral, for instance is called, in English, "heavy spar," — "spar", as I said, being miner's jargon for "stone." Its more formal name is "barytes" from the Greek word "baros" meaning "heavy". In 1808, element 56 was found to occur in barytes and was named barium.

In Sweden, also, a heavy mineral was discovered and was also called "heavy stone" — only in Swedish, so that the phrase came out, "tungsten." When in 1783, element 74 was found to be a component of that, there was, for once, no fanciness whatever involved. The element was named tungsten. However, in Germany, the same element was found to occur in a mineral called wolframite - derivation unknown — so it was given the name wolfram. In the same recent international conference that decided that columbium was really niobium, it was also decided to make wolfram the official name. Perhaps that is just as well. Even though we called the element tungsten, we used the chemical symbol W for it,

after wolfram. However, the Americans and British are putting up strong resistance, and I don't see signs yet of any mass-switch in the English-language literature from tungsten to wolfram.

Element 3 is named most prosaically of all these. It was discovered in 1817 and having been isolated from a stony material - as almost all the elements were - it was named lithium from the Greek word for "stone." Nothing more, just "stone."

Element 48 was discovered in 1817 in a kind of ore known to the Greeks as "kadmia." The element was named cadmium.

In the flurry of naming, two elements got their names from two other and completely different elements. This sort of mis-mating came about as follows.

In 1781, element 42 was discovered in a lead ore. That particular mineral was known by its Latin name of "molybdaena membranacea nitens." The "molybdaena" part was taken from the Greek word "molybdenos" for lead. Despite that fact, element 42 got the name of molybdenum.

Element 78 is a more unusual case. It was discovered in 1748 or thereabouts somewhere in South America. It is the only element ever discovered anywhere but in Europe - including the Near East - or in the United States. It is also the only element with a name derived from the Spanish. The element is a silvery metal; the Spanish work for silver is "plata"; the element is named platinum.

There is a rainbow of color hidden in the names of the elements. In the first place, some of the elements are colored and this serves as inspiration. Element 17, discovered in 1774, is a yellow-green gas. The Greek word for grass-green is "chloros" so the element is named chlorine. It is this chlorine, by the way, that was first called "muriatic oxide" and therefore missed, for a while, as an element.

Element 53 is similar to chlorine chemically, but it isn't a gas. It is a slate-gray solid which, when heated, is converted into a beautiful violet vapor. The Greek word for violet is "iodes" so the element — discovered in 1811 - is named iodine.

Iodine introduces us to the one place where the international conventions of element symbols is broken and that has come about in an odd way. The German alphabet, in its old-fashioned form - the kind that looks like Old English, only worse, with s's that look like f's and so on - does not have the letter "j." Instead, it uses the letter "i" both as a vowel and also as a consonant which is pronounced the way we pronounce "y". When German lettering is transliterated into the Latin alphabet the rest of West Europe - and America - uses, the vowel "i" is written "i", but the consonant "i" which comes only at the beginning of words, is written "j". Thus, we have "Ja" and "Johannes," pronounced, "Ya" and "Yohannes."

Very well, then, the German word for iodine is, in the Latin letters uniformly used in the German chemical literature, Jod, pronounced "yuhd." This is similar to part of the English pronunciation which is "ah-yuhdeen." The German symbol for iodine is "J" and in the rest of the world it is "I", but since the German "J" in Latin letters, is really "I" in their old Germanic script, the discrepancy seems forgivable to me.

After the middle of the nineteenth century, a number of elements were first detected spectroscopically. The color of the new spectral lines was, to begin with, the only information chemists had about the elements. For instance, elements 55 and 37 were discovered spectrocopically in 1860 and 1861 respectively. Element 55 showed a sky-blue line, element 37 a red one. The Latin word for sky-blue is "coesius" and for red is "rubidus." The elements were consequently named cesium and rubidium.

In 1861, element 81 was also discovered spectrocopically. To the discoverer, the new line appeared to be the fresh young green of a budding twig. (He obviously had a poetic soul.) The Latin word for a budding twig is "thallus," so he named the element thallium.

Element 49 was found to have an indigo-blud line in the spectrum so it was christened — when first observed in 1863 - indium. The word "indigo" comes from the plant which was originally named "indicus" since it came from India. Very indirectly, then, indium is names after India, which is the only Asiatic region so honored, however indirectly.

Some elements are not themselves colored, and weren't discovered spectroscopically, yet got color-names from the fact that their compounds are colored. Take element 45, for instance. When it was discovered in 1803, it was observed that many of its compounds were rose-red in color. The Greek word for rose is "rhodon" and the element was promptly named rhodium.

A little more complicated is the story of elements 59 and 60, two of the rare-earth elements. All these rare earth elements are so similar that it is hard to separate them. In 1839, elements 59 and 60 were

isolated together and considered a single element. Closely associated with them was still another rare-earth element which the discoverer detected and realized to be an impurity. He thereupon called elements 59 and 60 didymium from the Greek word "didymos" meaning twins, because he considered his mixture the twin of the third element which he had detected and knew about. Well, I've talked about elements that were named wrongly, but here's the case of an "element" that was named correctly without the discoverer even being aware of it. Didymium was indeed twins; twin elements.

In 1885, nearly half a century later, didymium was finally separated into its two components. Element 59 formed a number of compounds which, in solution, were a blud-green color like that of leek leaves. (Leeks are a vegetable similar to the onion.) The Greeks, who have a word for everything, had one for that particular shade of green, "praseos," so element 59 was named praseodymium, the "leek-green twin." Element 60, with complete lack of inspiration was named neodymium, the "new twin," though it was no newer than the other.

There's the rainbow: two different shades of blue - cesium and indium; three different shades of green - chlorine, praseodymium, and thallium; two different shades of red - rhodium and rubidium; and one shade of violet - iodine.

To top it off, there are two elements whose compounds are of a great many different colors. These are elements 24 and 77. The word for "color" in Greek is "chroma," so when element 24 was discovered in 1798, it was called chromium. The Greek goddess of the rainbow is Iris and in 1804, when element 77 was discovered, it was called iridium.

A property of some elements more dramatic than any amount of color is radioactivity; a capacity for breaking down, giving off mysterious rays and shining eerily.

The word for "ray" is "radius" in Latin and "aktis" in Greek. Four elements are named for "ray", two by way of Greek and two by way of Latin.

The first of these is element 88, discovered in 1898 and named radium for the radioactive rays it emitted. Radium breaks down to a gas, element 86, which was identified in 1900 and given the same name with the non-metal ending, radon. For a while, there was an alternate name for this gas, niton, from the Latin word "nitens," meaning "shining," but that lost out.)

Now to the Greek side of the family. Element 89 was discovered in 1899. It also gave off rays and, using the Greek, it was named actinium. Element 91, discovered in 1917, was bound to break down to actinium. It was actinium's parent, so to speak. It was therefore, named protactinium which, in Greek means "first actinium".

Another property of radioactive elements is their instability. They break down. When element number 85 was discovered in 1940, it was named astatine, meaning "unstable" in Greek. (This is the element, by the way, which was erroneously reported in 1931 and called alabamine.)

Finally, the very first artificial element, that is, one manufactured in the laboratory and not found in nature, was element 43 — reported, erroneously, in 1925 and named masurium. In 1939, it was made and given the name technetium, from the Greek word "technetos" meaning "artificial".

Sometimes the names of elements betray a bit of bad temper on the part of the discoverers. It is usually quite a task to isolate the suspected new element, make sure it is reasonably free of impurities and really new. The chemist might be allowed some mild swearing.

For instance, in 1839, the discoverer of element 57 called it lanthanum, from a Greek word meaning "to be concealed," while in 1886 element 66 was discovered and named dysprosium from a Greek word meaning "hard to get at."

Tantalum, which I mentioned earlier as being derived from the mythological character, Tantalus, may also belong here, since one story of its naming - a lot depends on the source you consult as to what story you get in this as in many other things - is that the discoverer, worn out by the difficulties of isolating it, named it thus because he himself had been tantalized almost part endurance as Tantalus had been.

The inert gases of the atmosphere are present in small quantities only and are hard to separate and distinguish. In 1898, when three of them were isolated, one - element 36 - was called krypton from a Greek word meaning "hidden" and another - element 54 - was named xenon from a Greek word meaning "stranger". The third - element 10 - with deplorable lack of imagination, was simply called neon from a Greek word meaning "new".

The most common of these inert gases - one which makes up fully one per cent of the atmosphere - is

element 18. It was discovered in 1895. Since it was the first inert gas to be studied, chemists were struck by the fact of its inertness; that is, that it would combine with no other element. It was named argon from a Greek word meaning "inert" or "lazy".

(As contrast. element 51, when discovered by alchemists some time in the Middle Ages seemed unusual to them because it always appeared in combination with other elements and never alone. It was named antimony from Latin words meaning "against solitude." The Romans knew of a mineral that contained antimoney and they called that mineral stibium. As vestigial remnant of the fact, the chemical symbol of antimony is Sb.)

Two and a fraction elements are distinguished by their bad odors and their discoverers made a point of that. Element 35 is a red liquid possessed of a distinctly unpleasant smell. It was discovered in 1826 and the offended chemist involved called it bormine from a Greek word meaning "stench".

Element 76 has no smell of its own, but its compound with oxygen is terrible. Its discoverer, in 1804, named it osmium, from the Greek word for "smell."

Where does the fractional element come in? Well, oxygen under ordinary conditions forms molecules made up of two oxygen atoms apiece. That is the ordinary oxygen we breathe. Under some conditions, oxygen can arrange itself into molecules of three oxygen atoms apiece. It has different properties then. The three-oxygen molecule is poisonous and has a sharp odor - a little like bromine, perhaps. It is called ozone, from the same Greek word meaning "smell."

This leaves several elements with names of which nobody knows the origin. Mostly, they are the elements known since primitive times. The ancients knew nine substances that today we recognize as elements. Among them are two non-metals, elements 6 and 16. Element 6 is carbon, which I've already mentioned. Element 16 is sulfur - German: Schwefel - which name, almost unchanged, can be traced back to the mists of antiquity and is lost there. An older English name is brimstone. This is a corruption of "brennstone," the "brenn" part being German, and presumably Anglo-Saxon, for "burn". In other words, sulfur was a "stone that burned."

The seven metals known to the ancients are elements 79, 47, 29, 26, 50, 82, and 80. Of these, element 29 is copper and element 80 is mercury. I've mentioned those. The others are: element 79, gold (German: Gold); element 47, silver (German: Silber) element 26, iron (German: Eisen); element 50, tin (German: Zinn); and element 82, lead (German Blei). Nothing more can be said about any of those names that isn't just conjecture.

(By the way, if you wonder why I capitalized the German names of the elements, the answer is that the Germans capitalize all nouns.)

The Romans had different names for each of those metals and the Roman names are today still enshrined in the chemical cymbols. I've already mentioned mercury's Hg for hydrargyrum and antimony's Sb for stibium. Well, the symbol of gold is Au (for aurum), that of silver is Ag (for argentum), that of copper is Cu (for cuprum), that of iron is Fe (for ferrum), that of tin is Sn (for stannum) and that of lead is Pb (for plumbum).

Strangely enough, one metal unknown to the ancients also manages to have an untracable name. The alchemists discovered discovered element 30 and called it zinc, derivation unknown. There is a chance the name comes from some alchemical confusion of zinc and tin, the latter of which is "Zinn" in German. This is doubtful. If true, however, zinc would be another element in the list of those named after other elements, along with molybdenum and platinum.

I've now gone through all one hundred and one elements, but before quitting this little trip around the periodic table, just a word about isotopes. Most elements consist of more than one isotope - varieties of the same element differing from one another only in the number of particles in the nucleus. Ordinarily, such isotopes aren't given special names but are distinguished by numbers. Thus, uranium-235 and uranium-238 are both uranium isotopes, but one has 235 particles in the nucleus and the other 238.

However, the isotopes of hydrogen - element 1 - are so different from one another in some respects that they have been accorded separate names. There are three hydrogen isotopes, one with only one particle in the nucleus, one with two and one with three. They are called respectively protium, deuterium and tritium, from Greek words meaning "first", "second" and "third."

Occasionally helium - element 2 - also gets special treatment. There are two helium isotopes, one with three particles in the nucleus and one with four. Helium-4 is the common variety and its nucleus is expelled from many exploding radioactive atoms. When these flying nuclei were discovered in the 1890's and before their nature was known, they were called simply alpha rays - "alpha" being the first letter

in the Greek alphabet. (There were aslo beta rays and gamma rays after the second and third letters.)

Well, helium-3 is a kind of alpha ray, so to speak, with only three particles in it, a "triple-alpha," or shortening that, and putting on the -ium ending, tralphium.

There, now. I'm through and, if you don't mind, I shall not lie down and catch my breath.

I N D E X

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